



SEQUENCE LISTING

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MIELE, Robert G.  
NETT, Juergen H.  
DAVIDSON, Robert C.

<120> METHODS TO ENGINEER MAMMALIAN-TYPE  
CARBOHYDRATE STRUCTURES

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<140> 10/500,240

<141> 2005-03-23

<150> PCT/US02/41510

<151> 2002-12-24

<150> 60/344,169

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agcgatgcta taggcagtct ttgcagag

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<210> 23

<211> 4

<212> PRT

<213> Saccharomyces cerevisiae

<400> 23

His Asp Glu Leu

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<210> 24

<211> 458

<212> PRT

<213> Saccharomyces cerevisiae

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<222> (304)...(318)

<223> Xaa is a variable amino acid

<220>

<221> MOD\_RES

<222> (416)...(436)

<223> Xaa is a variable amino acid

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Met Glu Gly Glu Gln Ser Pro Gln Gly Glu Lys Ser Leu Gln Arg Lys



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Gln Phe Val Arg Pro Pro Leu Asp Leu Trp Gln Asp Leu Lys Asp Gly			
20	25	30	
Val Arg Tyr Val Ile Phe Asp Cys Arg Ala Asn Leu Ile Val Met Pro			
35	40	45	
Leu Leu Ile Leu Phe Glu Ser Met Leu Cys Lys Ile Ile Ile Lys Lys			
50	55	60	
Val Ala Tyr Thr Glu Ile Asp Tyr Lys Ala Tyr Met Glu Gln Ile Glu			
65	70	75	80
Met Ile Gln Leu Asp Gly Met Leu Asp Tyr Ser Gln Val Ser Gly Gly			
85	90	95	
Thr Gly Pro Leu Val Tyr Pro Ala Gly His Val Leu Ile Tyr Lys Met			
100	105	110	
Met Tyr Trp Leu Thr Glu Gly Met Asp His Val Glu Arg Gly Gln Val			
115	120	125	
Phe Phe Arg Tyr Leu Tyr Leu Leu Thr Leu Ala Leu Gln Met Ala Cys			
130	135	140	
Tyr Tyr Leu Leu His Leu Pro Pro Trp Cys Val Val Leu Ala Cys Leu			
145	150	155	160
Ser Lys Arg Leu His Ser Ile Tyr Val Leu Arg Leu Phe Asn Asp Cys			
165	170	175	
Phe Thr Thr Leu Phe Met Val Val Thr Val Leu Gly Ala Ile Val Ala			
180	185	190	
Ser Arg Cys His Gln Arg Pro Lys Leu Lys Lys Ser Leu Ala Leu Val			
195	200	205	
Ile Ser Ala Thr Tyr Ser Met Ala Val Ser Ile Lys Met Asn Ala Leu			
210	215	220	
Leu Tyr Phe Pro Ala Met Met Ile Ser Leu Phe Ile Leu Asn Asp Ala			
225	230	235	240
Asn Val Ile Leu Thr Leu Leu Asp Leu Val Ala Met Ile Ala Trp Gln			
245	250	255	
Val Ala Val Ala Val Pro Phe Leu Arg Ser Phe Pro Gln Gln Tyr Leu			
260	265	270	
His Cys Ala Phe Asn Phe Gly Arg Lys Phe Met Tyr Gln Trp Ser Ile			
275	280	285	
Asn Trp Gln Met Met Asp Glu Glu Ala Phe Asn Asp Lys Arg Phe Xaa			
290	295	300	

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Val  
 305 310 315 320  
 Thr Arg Tyr Pro Arg Ile Leu Pro Asp Leu Trp Ser Ser Leu Cys His  
 325 330 335  
 Pro Leu Arg Lys Asn Ala Val Leu Asn Ala Asn Pro Ala Lys Thr Ile  
 340 345 350  
 Pro Phe Val Leu Ile Ala Ser Asn Phe Ile Gly Val Leu Phe Ser Arg  
 355 360 365  
 Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Ile  
 370 375 380  
 Leu Ile Phe Trp Ser Gly Met Pro Phe Phe Val Gly Pro Ile Trp Tyr  
 385 390 395 400  
 Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro Pro Asn Ser Gln Xaa  
 405 410 415  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 420 425 430  
 Xaa Xaa Xaa Xaa Ser Gly Ser Val Ala Leu Ala Lys Ser His Leu Arg  
 435 440 445  
 Thr Thr Ser Ser Met Glu Lys Lys Leu Asn  
 450 455

<210> 25

<211> 458

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 25

Met Glu Gly Glu Gln Ser Pro Gln Gly Glu Lys Ser Leu Gln Arg Lys  
 1 5 10 15  
 Gln Phe Val Arg Pro Pro Leu Asp Leu Trp Gln Asp Leu Lys Asp Gly  
 20 25 30  
 Val Arg Tyr Val Ile Phe Asp Cys Arg Ala Asn Leu Ile Val Met Pro  
 35 40 45  
 Leu Leu Ile Leu Phe Glu Ser Met Leu Cys Lys Ile Ile Ile Lys Lys  
 50 55 60  
 Val Ala Tyr Thr Glu Ile Asp Tyr Lys Ala Tyr Met Glu Gln Ile Glu

65		70		75		80
Met	Ile	Gln	Leu	Asp	Gly	Met
		85		90		95
Thr	Gly	Pro	Leu	Val	Tyr	Pro
		100		105		110
Met	Tyr	Trp	Leu	Thr	Glu	Gly
		115		120		125
Phe	Phe	Arg	Tyr	Leu	Tyr	Leu
		130		135		140
Tyr	Tyr	Leu	Leu	His	Leu	Pro
		145		150		155
Ser	Lys	Arg	Leu	His	Ser	Ile
		165		170		175
Phe	Thr	Thr	Leu	Phe	Met	Val
		180		185		190
Ser	Arg	Cys	His	Gln	Arg	Pro
		195		200		205
Ile	Ser	Ala	Thr	Tyr	Ser	Met
		210		215		220
Leu	Tyr	Phe	Pro	Ala	Met	Met
		225		230		235
Asn	Val	Ile	Leu	Thr	Leu	Leu
		245		250		255
Val	Ala	Val	Ala	Val	Pro	Phe
		260		265		270
His	Cys	Ala	Phe	Asn	Phe	Gly
		275		280		285
Asn	Trp	Gln	Met	Met	Asp	Glu
		290		295		300
Leu	Ala	Leu	Leu	Ile	Ser	His
		305		310		315
Thr	Arg	Tyr	Pro	Arg	Ile	Leu
		325		330		335
Pro	Leu	Arg	Lys	Asn	Ala	Val
		340		345		350
Pro	Phe	Val	Leu	Ile	Ala	Ser
		355		360		365

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Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Ile
  370                      375                      380
Leu Ile Phe Trp Ser Gly Met Pro Phe Phe Val Gly Pro Ile Trp Tyr
385                      390                      395                      400
Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro Pro Asn Ser Gln Ala
                      405                      410                      415
Ser Thr Leu Leu Leu Ala Leu Asn Thr Val Leu Leu Leu Leu Leu Ala
                      420                      425                      430
Leu Thr Gln Leu Ser Gly Ser Val Ala Leu Ala Lys Ser His Leu Arg
                      435                      440                      445
Thr Thr Ser Ser Met Glu Lys Lys Leu Asn
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<210> 26

<211> 443

<212> PRT

<213> *Saccharomyces cerevisiae*

<220>

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<222> (333)...(347)

<223> Xaa is a variable amino acid

<400> 26

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Trp Gln Asp Leu Lys Asp Gly Val Arg Tyr Val Ile Phe Asp Cys Arg
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Ala Asn Leu Ile Val Met Pro Leu Leu Ile Leu Phe Glu Ser Met Leu
                      20                      25                      30
Cys Lys Ile Ile Ile Lys Lys Val Ala Tyr Thr Glu Ile Asp Tyr Lys
                      35                      40                      45
Ala Tyr Met Glu Gln Ile Glu Met Ile Gln Leu Asp Gly Met Leu Asp
                      50                      55                      60
Tyr Ser Gln Val Ser Gly Gly Thr Gly Pro Leu Val Tyr Pro Ala Gly
65                      70                      75                      80
His Val Leu Ile Tyr Lys Met Met Tyr Trp Leu Thr Glu Gly Met Asp
                      85                      90                      95

```

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His Val Glu Arg Gly Gln Val Phe Phe Arg Tyr Leu Tyr Leu Leu Thr
      100                      105                      110
Leu Ala Leu Gln Met Ala Cys Tyr Tyr Leu Leu His Leu Pro Pro Trp
      115                      120                      125
Cys Val Val Leu Ala Cys Leu Ser Lys Arg Leu His Ser Ile Tyr Val
      130                      135                      140
Leu Arg Leu Phe Asn Asp Cys Phe Thr Thr Leu Phe Met Val Val Thr
145                      150                      155                      160
Val Leu Gly Ala Ile Val Ala Ser Arg Cys His Gln Arg Pro Lys Leu
      165                      170                      175
Lys Lys His Gln Thr Cys Lys Val Pro Pro Phe Val Phe Phe Phe Met
      180                      185                      190
Cys Cys Ala Ser Tyr Arg Val His Ser Ile Phe Val Leu Arg Leu Phe
      195                      200                      205
Asn Asp Pro Val Ala Met Val Leu Leu Phe Leu Ser Ile Asn Leu Leu
      210                      215                      220
Leu Ala Gln Arg Trp Gly Trp Gly Ser Leu Ala Leu Val Ile Ser Ala
225                      230                      235                      240
Thr Tyr Ser Met Ala Val Ser Ile Lys Met Asn Ala Leu Leu Tyr Phe
      245                      250                      255
Pro Ala Met Met Ile Ser Leu Phe Ile Leu Asn Asp Ala Asn Val Ile
      260                      265                      270
Leu Thr Leu Leu Asp Leu Val Ala Met Ile Ala Trp Gln Val Ala Val
      275                      280                      285
Ala Val Pro Phe Leu Arg Ser Phe Pro Gln Gln Tyr Leu His Cys Ala
      290                      295                      300
Phe Asn Phe Gly Arg Lys Phe Met Tyr Gln Trp Ser Ile Asn Trp Gln
305                      310                      315                      320
Met Met Asp Glu Glu Ala Phe Asn Asp Lys Arg Phe Xaa Xaa Xaa Xaa
      325                      330                      335
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Val Thr Arg Tyr
      340                      345                      350
Pro Arg Ile Leu Pro Asp Leu Trp Ser Ser Leu Cys His Pro Leu Arg
      355                      360                      365
Lys Asn Ala Val Leu Asn Ala Asn Pro Ala Lys Thr Ile Pro Phe Val
      370                      375                      380
Leu Ile Ala Ser Asn Phe Ile Gly Val Leu Phe Ser Arg Ser Leu His

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385		390		395		400
Tyr	Gln	Phe	Leu	Ser	Trp	Tyr
		405		410		415
Trp	Ser	Gly	Met	Pro	Phe	Phe
		420		425		430
Glu	Trp	Cys	Trp	Asn	Ser	Tyr
		435		440		

<210> 27

<211> 373

<212> PRT

<213> Homo sapiens

<400> 27

Trp	Gln	Glu	Arg	Arg	Leu	Leu	Leu	Arg	Glu	Pro	Arg	Tyr	Thr	Leu	Leu
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Val	Ala	Ala	Cys	Leu	Cys	Leu	Ala	Glu	Val	Gly	Ile	Thr	Phe	Trp	Val
				20				25					30		
Ile	His	Arg	Val	Ala	Tyr	Thr	Glu	Ile	Asp	Trp	Lys	Ala	Tyr	Met	Ala
				35				40					45		
Glu	Val	Glu	Gly	Val	Gly	Thr	Tyr	Asp	Tyr	Thr	Gln	Leu	Gln	Gly	Asp
				50				55					60		
Thr	Gly	Pro	Leu	Val	Tyr	Pro	Ala	Gly	Phe	Val	Tyr	Ile	Phe	Met	Gly
65					70				75					80	
Leu	Tyr	Tyr	Ala	Thr	Ser	Arg	Gly	Thr	Asp	Ile	Arg	Met	Ala	Gln	Asn
				85					90					95	
Ile	Phe	Ala	Val	Leu	Tyr	Leu	Ala	Thr	Leu	Leu	Leu	Val	Phe	Leu	Ile
				100				105					110		
Tyr	His	Gln	Thr	Cys	Lys	Val	Pro	Pro	Phe	Val	Phe	Phe	Phe	Met	Cys
				115				120					125		
Cys	Ala	Ser	Tyr	Arg	Val	His	Ser	Ile	Phe	Val	Leu	Arg	Leu	Phe	Asn
				130				135					140		
Asp	Pro	Val	Ala	Met	Val	Leu	Leu	Phe	Leu	Ser	Ile	Asn	Leu	Leu	Leu
145					150				155					160	
Ala	Gln	Arg	Trp	Gly	Trp	Gly	Cys	Cys	Phe	Phe	Ser	Leu	Ala	Val	Ser
				165					170					175	

Val	Lys	Met	Asn	Val	Leu	Leu	Phe	Ala	Pro	Gly	Leu	Leu	Phe	Leu	Leu
			180					185					190		
Leu	Thr	Gln	Phe	Gly	Phe	Arg	Gly	Ala	Leu	Pro	Lys	Leu	Gly	Ile	Cys
		195					200					205			
Ala	Gly	Leu	Gln	Val	Val	Leu	Gly	Leu	Pro	Phe	Leu	Leu	Glu	Asn	Pro
	210					215					220				
Ser	Gly	Tyr	Leu	Ser	Arg	Ser	Phe	Asp	Leu	Gly	Arg	Gln	Phe	Leu	Phe
225					230				235					240	
His	Trp	Thr	Val	Asn	Trp	Arg	Phe	Leu	Pro	Glu	Ala	Leu	Phe	Leu	His
			245					250					255		
Arg	Ala	Phe	His	Leu	Ala	Leu	Leu	Thr	Ala	His	Leu	Thr	Leu	Leu	Leu
		260						265					270		
Leu	Phe	Ala	Leu	Cys	Arg	Trp	His	Arg	Thr	Gly	Glu	Ser	Ile	Leu	Ser
	275						280					285			
Leu	Leu	Arg	Asp	Pro	Ser	Lys	Arg	Lys	Val	Pro	Pro	Gln	Pro	Leu	Thr
	290					295				300					
Pro	Asn	Gln	Ile	Val	Ser	Thr	Leu	Phe	Thr	Ser	Asn	Phe	Ile	Gly	Ile
305					310					315				320	
Cys	Phe	Ser	Arg	Ser	Leu	His	Tyr	Gln	Phe	Tyr	Val	Trp	Tyr	Phe	His
			325						330				335		
Thr	Leu	Pro	Tyr	Leu	Leu	Trp	Ala	Met	Pro	Ala	Arg	Trp	Leu	Thr	His
		340						345					350		
Leu	Leu	Arg	Leu	Leu	Val	Leu	Gly	Leu	Ile	Glu	Leu	Ser	Trp	Asn	Thr
	355						360					365			
Tyr	Pro	Ser	Thr	Ser											
	370														

<210> 28

<211> 269

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 28

Val	Arg	Tyr	Val	Ile	Phe	Asp	Cys	Arg	Ala	Asn	Leu	Ile	Val	Met	Pro
1				5					10				15		
Leu	Leu	Ile	Leu	Phe	Glu	Ser	Met	Leu	Cys	Lys	Ile	Ile	Ile	Lys	Lys





<400> 29

Ile	Lys	Tyr	Leu	Ala	Phe	Glu	Pro	Ala	Ala	Leu	Pro	Ile	Val	Ser	Val
1				5					10					15	
Leu	Ile	Val	Leu	Ala	Glu	Ala	Val	Ile	Asn	Val	Leu	Val	Ile	Gln	Arg
			20					25					30		
Val	Pro	Tyr	Thr	Glu	Ile	Asp	Trp	Lys	Ala	Tyr	Met	Gln	Glu	Cys	Glu
		35					40					45			
Gly	Phe	Leu	Asn	Gly	Thr	Thr	Asn	Tyr	Ser	Leu	Leu	Arg	Gly	Asp	Thr
	50					55					60				
Gly	Pro	Leu	Val	Tyr	Pro	Ala	Ala	Phe	Val	Tyr	Ile	Tyr	Ser	Gly	Leu
65				70					75					80	
Tyr	Tyr	Leu	Thr	Gly	Gln	Gly	Thr	Asn	Val	Arg	Leu	Ala	Gln	Tyr	Ile
			85					90					95		
Phe	Ala	Cys	Ile	Tyr	Leu	Leu	Gln	Met	Cys	Leu	Val	Leu	Arg	Leu	Tyr
		100						105					110		
Thr	Lys	Ser	Arg	Lys	Val	Pro	Pro	Tyr	Val	Leu	Val	Leu	Ser	Ala	Phe
		115					120					125			
Thr	Ser	Tyr	Arg	Ile	His	Ser	Ile	Tyr	Val	Leu	Arg	Leu	Phe	Asn	Asp
	130					135					140				
Pro	Val	Ala	Ile	Leu	Leu	Leu	Tyr	Ala	Ala	Leu	Asn	Leu	Phe	Leu	Asp
145				150						155				160	
Gln	Arg	Trp	Thr	Leu	Gly	Ser	Ile	Cys	Tyr	Ser	Leu	Ala	Val	Gly	Val
			165					170					175		
Lys	Met	Asn	Ile	Leu	Leu	Phe	Ala	Pro	Ala	Leu	Leu	Leu	Phe	Tyr	Leu
		180					185						190		
Ala	Asn	Leu	Gly	Val	Leu	Arg	Thr	Leu	Val	Gln	Leu	Thr	Ile	Cys	Ala
	195						200					205			
Val	Leu	Gln	Leu	Phe	Ile	Gly	Ala	Pro	Phe	Leu	Arg	Thr	His	Pro	Met
	210					215					220				
Glu	Tyr	Leu	Arg	Gly	Ser	Phe	Asp	Leu	Gly	Arg	Ile	Phe	Glu	His	Lys
225					230					235				240	
Trp	Thr	Val	Asn	Tyr	Arg	Phe	Leu	Ser	Lys	Glu	Leu	Phe	Glu	Gln	Arg
			245						250				255		
Glu	Phe														

<210> 30

<211> 267

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 30

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Arg Tyr Val Ile Phe Asp Cys Arg Ala Asn Leu Ile Val Met Pro Leu
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Leu Ile Leu Phe Glu Ser Met Leu Cys Lys Ile Ile Ile Lys Lys Val
      20             25             30
Ala Tyr Thr Glu Ile Asp Tyr Lys Ala Tyr Met Glu Gln Ile Glu Met
      35             40             45
Ile Gln Leu Asp Gly Met Leu Asp Tyr Ser Gln Val Ser Gly Gly Thr
      50             55             60
Gly Pro Leu Val Tyr Pro Ala Gly His Val Leu Ile Tyr Lys Met Met
65             70             75             80
Tyr Trp Leu Thr Glu Gly Met Asp His Val Glu Arg Gly Gln Val Phe
      85             90             95
Phe Arg Tyr Leu Tyr Leu Leu Thr Leu Ala Leu Gln Met Ala Cys Tyr
      100            105            110
Tyr Leu Leu His Trp Cys Val Val Leu Ala Cys Leu Ser Lys Arg Leu
      115            120            125
His Ser Ile Tyr Val Leu Arg Leu Phe Asn Asp Cys Phe Thr Thr Leu
      130            135            140
Phe Met Val Val Thr Val Leu Gly Ala Ile Val Ala Ser Arg Cys His
145            150            155            160
Gln Arg Pro Lys Leu Lys Lys Ser Leu Ala Leu Val Ile Ser Ala Thr
      165            170            175
Tyr Ser Met Ala Val Ser Ile Lys Met Asn Ala Leu Leu Tyr Phe Pro
      180            185            190
Ala Met Met Ile Ser Leu Phe Ile Leu Asn Asp Ala Asn Val Ile Leu
      195            200            205
Thr Leu Leu Asp Leu Val Ala Met Ile Ala Trp Gln Val Ala Val Ala
      210            215            220
Val Pro Phe Leu Arg Ser Phe Pro Gln Gln Tyr Leu His Cys Ala Phe
225            230            235            240

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Asn Phe Gly Arg Lys Phe Met Tyr Gln Trp Ser Ile Asn Trp Gln Met
      245                      250                      255
Met Asp Glu Glu Ala Phe Asn Asp Lys Arg Phe
      260                      265

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<210> 31
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<212> PRT
<213> Drosophila melanogaster

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Lys Tyr Leu Leu Leu Glu Pro Ala Ala Leu Pro Ile Val Gly Leu Phe
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Val Leu Leu Ala Glu Leu Val Ile Asn Val Val Val Ile Gln Arg Val
      20              25              30
Pro Tyr Thr Glu Ile Asp Trp Val Ala Tyr Met Gln Glu Cys Glu Gly
      35              40              45
Phe Leu Asn Gly Thr Thr Asn Tyr Ser Leu Leu Arg Gly Asp Thr Gly
      50              55              60
Pro Leu Val Tyr Pro Ala Ala Phe Val Tyr Ile Tyr Ser Ala Leu Tyr
  65              70              75              80
Tyr Val Thr Ser His Gly Thr Asn Val Arg Leu Ala Gln Tyr Ile Phe
      85              90              95
Ala Gly Ile Tyr Leu Leu Gln Leu Ala Leu Val Leu Arg Leu Tyr Ser
      100             105             110
Lys Ser Arg Lys Val Pro Pro Tyr Val Leu Val Leu Ser Ala Phe Thr
      115             120             125
Ser Tyr Arg Ile His Ser Ile Tyr Val Leu Arg Leu Phe Asn Asp Pro
      130             135             140
Val Ala Val Leu Leu Leu Tyr Ala Ala Leu Asn Leu Phe Leu Asp Arg
  145             150             155             160
Arg Trp Thr Leu Gly Ser Thr Phe Phe Ser Leu Ala Val Gly Val Lys
      165             170             175
Met Asn Ile Leu Leu Phe Ala Pro Ala Leu Leu Leu Phe Tyr Leu Ala
      180             185             190
Asn Leu Gly Leu Leu Arg Thr Ile Leu Gln Leu Ala Val Cys Gly Val

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195	200	205
Ile Gln Leu Leu Leu Gly Ala Pro Phe Leu Leu Thr His Pro Val Glu		
210	215	220
Tyr Leu Arg Gly Ser Phe Asp Leu Gly Arg Ile Phe Glu His Lys Trp		
225	230	235
Thr Val Asn Tyr Arg Phe Leu Ser Arg Asp Val Phe Glu Asn Arg Thr		
245	250	255
Phe		

<210> 32  
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 <212> DNA  
 <213> *Saccharomyces cerevisiae*

<400> 32

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<210> 33

<211> 458

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 33

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			20					25					30		
Val	Arg	Tyr	Val	Ile	Phe	Asp	Cys	Arg	Ala	Asn	Leu	Ile	Val	Met	Pro
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Leu	Leu	Ile	Leu	Phe	Glu	Ser	Met	Leu	Cys	Lys	Ile	Ile	Ile	Lys	Lys
	50					55				60					
Val	Ala	Tyr	Thr	Glu	Ile	Asp	Tyr	Lys	Ala	Tyr	Met	Glu	Gln	Ile	Glu
65					70				75					80	
Met	Ile	Gln	Leu	Asp	Gly	Met	Leu	Asp	Tyr	Ser	Gln	Val	Ser	Gly	Gly
			85					90					95		
Thr	Gly	Pro	Leu	Val	Tyr	Pro	Ala	Gly	His	Val	Leu	Ile	Tyr	Lys	Met
		100					105					110			
Met	Tyr	Trp	Leu	Thr	Glu	Gly	Met	Asp	His	Val	Glu	Arg	Gly	Gln	Val
	115					120					125				
Phe	Phe	Arg	Tyr	Leu	Tyr	Leu	Leu	Thr	Leu	Ala	Leu	Gln	Met	Ala	Cys
	130					135				140					
Tyr	Tyr	Leu	Leu	His	Leu	Pro	Pro	Trp	Cys	Val	Val	Leu	Ala	Cys	Leu
145				150					155				160		
Ser	Lys	Arg	Leu	His	Ser	Ile	Tyr	Val	Leu	Arg	Leu	Phe	Asn	Asp	Cys
			165					170				175			
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		180					185				190				
Ser	Arg	Cys	His	Gln	Arg	Pro	Lys	Leu	Lys	Lys	Ser	Leu	Ala	Leu	Val
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Ile	Ser	Ala	Thr	Tyr	Ser	Met	Ala	Val	Ser	Ile	Lys	Met	Asn	Ala	Leu

210	215	220
Leu Tyr Phe Pro Ala Met Met Ile Ser Leu Phe Ile Leu Asn Asp Ala		
225	230	235
Asn Val Ile Leu Thr Leu Leu Asp Leu Val Ala Met Ile Ala Trp Gln		240
245	250	255
Val Ala Val Ala Val Pro Phe Leu Arg Ser Phe Pro Gln Gln Tyr Leu		
260	265	270
His Cys Ala Phe Asn Phe Gly Arg Lys Phe Met Tyr Gln Trp Ser Ile		
275	280	285
Asn Trp Gln Met Met Asp Glu Glu Ala Phe Asn Asp Lys Arg Phe His		
290	295	300
Leu Ala Leu Leu Ile Ser His Leu Ile Ala Leu Thr Thr Leu Phe Val		
305	310	315
Thr Arg Tyr Pro Arg Ile Leu Pro Asp Leu Trp Ser Ser Leu Cys His		320
325	330	335
Pro Leu Arg Lys Asn Ala Val Leu Asn Ala Asn Pro Ala Lys Thr Ile		
340	345	350
Pro Phe Val Leu Ile Ala Ser Asn Phe Ile Gly Val Leu Phe Ser Arg		
355	360	365
Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Ile		
370	375	380
Leu Ile Phe Trp Ser Gly Met Pro Phe Phe Val Gly Pro Ile Trp Tyr		
385	390	395
Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro Pro Asn Ser Gln Ala		400
405	410	415
Ser Thr Leu Leu Leu Ala Leu Asn Thr Val Leu Leu Leu Leu Leu Ala		
420	425	430
Leu Thr Gln Leu Ser Gly Ser Val Ala Leu Ala Lys Ser His Leu Arg		
435	440	445
Thr Thr Ser Ser Met Glu Lys Lys Leu Asn		
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<210> 34

<211> 1395

<212> DNA

<213> Pichia pastoris

<400> 34

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ttagggaaaa tacctccggg ttatthttgtt ttggttggtag cgtccaagag actgcattca 480
atatttggtat tgagactctt caatgactgt ttaacaacat ttttgatgtt ggcaactata 540
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cctgatgctg cagatacgtc cagtttagcc atctctgtaa agatgaatgc gctgctatac 660
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gcacctgttc tagttttgat attggtgcaa gtaggagtcg gttattcgtt cattttaccg 780
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gacattttca aattttggaa gccaacctta tctccaacca atattatcaa cgaccagaa 1080
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gcaagatctt tacactacca gttcctaagc tggatgcgt tctctttgcc atatctcctt 1200
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<210> 35

<211> 464

<212> PRT

<213> *Pichia pastoris*

<400> 35

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      20             25             30

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Asp	Phe	Ser	Val	Phe	Val	Ala	Pro	Leu	Leu	Trp	Leu	Ala	Asp	Ser	Ile
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Val	Ile	Lys	Val	Ile	Ile	Gly	Thr	Val	Ser	Tyr	Thr	Asp	Ile	Asp	Phe
	50					55					60				
Ser	Ser	Tyr	Met	Gln	Gln	Ile	Phe	Lys	Ile	Arg	Gln	Gly	Glu	Leu	Asp
65				70					75					80	
Tyr	Ser	Asn	Ile	Phe	Gly	Asp	Thr	Gly	Pro	Leu	Val	Tyr	Pro	Ala	Gly
			85					90						95	
His	Val	His	Ala	Tyr	Ser	Val	Leu	Ser	Trp	Tyr	Ser	Asp	Gly	Gly	Glu
			100					105					110		
Asp	Val	Ser	Phe	Val	Gln	Gln	Ala	Phe	Gly	Trp	Leu	Tyr	Leu	Gly	Cys
		115					120					125			
Leu	Leu	Leu	Ser	Ile	Ser	Ser	Tyr	Phe	Phe	Ser	Gly	Leu	Gly	Lys	Ile
	130					135					140				
Pro	Pro	Val	Tyr	Phe	Val	Leu	Leu	Val	Ala	Ser	Lys	Arg	Leu	His	Ser
145					150					155				160	
Ile	Phe	Val	Leu	Arg	Leu	Phe	Asn	Asp	Cys	Leu	Thr	Thr	Phe	Leu	Met
			165					170					175		
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		180					185						190		
Gly	Thr	Thr	Ile	Pro	Leu	Ser	Val	Pro	Asp	Ala	Ala	Asp	Thr	Tyr	Ser
	195						200					205			
Leu	Ala	Ile	Ser	Val	Lys	Met	Asn	Ala	Leu	Leu	Tyr	Leu	Pro	Ala	Phe
	210					215					220				
Leu	Leu	Leu	Ile	Tyr	Leu	Ile	Cys	Asp	Glu	Asn	Leu	Ile	Lys	Ala	Leu
225					230				235					240	
Ala	Pro	Val	Leu	Val	Leu	Ile	Leu	Val	Gln	Val	Gly	Val	Gly	Tyr	Ser
			245					250					255		
Phe	Ile	Leu	Pro	Leu	His	Tyr	Asp	Asp	Gln	Ala	Asn	Glu	Ile	Arg	Ser
		260						265					270		
Ala	Tyr	Phe	Arg	Gln	Ala	Phe	Asp	Phe	Ser	Arg	Gln	Phe	Leu	Tyr	Lys
		275					280					285			
Trp	Thr	Val	Asn	Trp	Arg	Phe	Leu	Ser	Gln	Glu	Thr	Phe	Asn	Asn	Val
	290					295					300				
His	Phe	His	Gln	Leu	Leu	Phe	Ala	Leu	His	Ile	Ile	Thr	Leu	Val	Leu
305				310					315					320	
Phe	Ile	Leu	Lys	Phe	Leu	Ser	Pro	Lys	Asn	Ile	Gly	Lys	Pro	Leu	Gly



	325		330		335										
Arg	Phe	Val	Leu	Asp	Ile	Phe	Lys	Phe	Trp	Lys	Pro	Thr	Leu	Ser	Pro
	340						345						350		
Thr	Asn	Ile	Ile	Asn	Asp	Pro	Glu	Arg	Ser	Pro	Asp	Phe	Val	Tyr	Thr
	355						360						365		
Val	Met	Ala	Thr	Thr	Asn	Leu	Ile	Gly	Val	Leu	Phe	Ala	Arg	Ser	Leu
	370						375						380		
His	Tyr	Gln	Phe	Leu	Ser	Trp	Tyr	Ala	Phe	Ser	Leu	Pro	Tyr	Leu	Leu
385						390				395				400	
Tyr	Lys	Ala	Arg	Leu	Asn	Phe	Ile	Ala	Ser	Ile	Ile	Val	Tyr	Ala	Ala
				405					410					415	
His	Glu	Tyr	Cys	Trp	Leu	Val	Phe	Pro	Ala	Thr	Glu	Gln	Ser	Ser	Ala
				420					425					430	
Leu	Leu	Val	Ser	Ile	Leu	Leu	Leu	Ile	Leu	Ile	Leu	Ile	Phe	Thr	Asn
				435					440					445	
Glu	Gln	Leu	Phe	Pro	Ser	Gln	Ser	Val	Pro	Ala	Glu	Lys	Lys	Asn	Thr
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<210> 36

<211> 418

<212> PRT

<213> Pichia pastoris

<220>

<221> MUTAGEN

<222> (209)...(223)

<223> Xaa is a variable amino acid

<220>

<221> MOD\_RES

<222> (235)...(246)

<223> Xaa is a variable amino acid

<400> 36

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20				25				30							
Leu	Leu	Trp	Leu	Ala	Asp	Ser	Ile	Val	Ile	Lys	Val	Ile	Ile	Gly	Thr
35				40				45							
Val	Ser	Tyr	Thr	Asp	Ile	Asp	Phe	Ser	Ser	Tyr	Met	Gln	Gln	Ile	Phe
50				55				60							
Lys	Ile	Arg	Gln	Gly	Glu	Leu	Asp	Tyr	Ser	Asn	Ile	Phe	Gly	Asp	Thr
65				70				75				80			
Gly	Pro	Leu	Val	Tyr	Pro	Ala	Gly	His	Val	His	Ala	Tyr	Ser	Val	Leu
85				90				95							
Ser	Trp	Tyr	Ser	Asp	Gly	Gly	Glu	Asp	Val	Ser	Phe	Val	Gln	Gln	Ala
100				105				110							
Phe	Gly	Trp	Leu	Tyr	Leu	Gly	Cys	Leu	Leu	Leu	Ser	Ile	Ser	Ser	Tyr
115				120				125							
Phe	Phe	Ser	Gly	Leu	Gly	Lys	Ile	Pro	Pro	Val	Tyr	Phe	Val	Leu	Leu
130				135				140							
Val	Ala	Ser	Lys	Arg	Leu	His	Ser	Ile	Phe	Val	Leu	Arg	Leu	Phe	Asn
145				150				155				160			
Asp	Cys	Leu	Thr	Thr	Phe	Leu	Met	Leu	Ala	Thr	Ile	Ile	Ile	Leu	Gln
165				170				175							
Gln	Ala	Ser	Ser	Trp	Arg	Lys	Asp	Gly	Thr	Thr	Ile	Pro	Leu	Ser	Val
180				185				190							
Pro	Asp	Ala	Ala	Asp	Thr	Tyr	Ser	Leu	Ala	Ile	Ser	Val	Lys	Met	Asn
195				200				205							
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Cys
210				215				220							
Asp	Glu	Asn	Leu	Ile	Lys	Ala	Leu	Ala	Pro	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
225				230				235				240			
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Tyr	Ser	Phe	Ile	Leu	Pro	Leu	His	Tyr	Asp
245				250				255							
Asp	Gln	Ala	Asn	Glu	Ile	Arg	Ser	Ala	Tyr	Phe	Arg	Gln	Ala	Phe	Asp
260				265				270							
Phe	Ser	Arg	Gln	Phe	Leu	Tyr	Lys	Trp	Thr	Val	Asn	Trp	Arg	Phe	Leu
275				280				285							
Ser	Gln	Glu	Thr	Phe	Asn	Asn	Val	His	Phe	His	Gln	Leu	Leu	Phe	Ala
290				295				300							
Leu	His	Ile	Ile	Thr	Leu	Val	Leu	Phe	Ile	Leu	Lys	Phe	Leu	Ser	Pro

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Lys Asn Ile Gly Lys Pro Leu Gly Arg Phe Val Leu Asp Ile Phe Lys			
	325	330	335
Phe Trp Lys Pro Thr Leu Ser Pro Thr Asn Ile Ile Asn Pro Asp Phe			
	340	345	350
Val Tyr Thr Val Met Ala Thr Thr Asn Leu Ile Gly Val Leu Phe Ala			
	355	360	365
Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr Ala Phe Ser Leu Pro			
	370	375	380
Tyr Leu Leu Tyr Lys Ala Arg Leu Asn Phe Ile Ala Ser Ile Ile Val			
385	390	395	400
Tyr Ala Ala His Glu Tyr Cys Trp Leu Val Phe Pro Ala Thr Glu Gln			
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Ser Ser			

<210> 37

<211> 398

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 37

Arg Pro Pro Leu Asp Leu Trp Gln Asp Leu Lys Asp Gly Val Arg Tyr			
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	20	25	30
Leu Phe Glu Ser Met Leu Cys Lys Ile Ile Ile Lys Lys Val Ala Tyr			
	35	40	45
Thr Glu Ile Asp Tyr Lys Ala Tyr Met Glu Gln Ile Glu Met Ile Gln			
50	55	60	
Leu Asp Gly Met Leu Asp Tyr Ser Gln Val Ser Gly Gly Thr Gly Pro			
65	70	75	80
Leu Val Tyr Pro Ala Gly His Val Leu Ile Tyr Lys Met Met Tyr Trp			
	85	90	95
Leu Thr Glu Gly Met Asp His Val Glu Arg Gly Gln Val Phe Phe Arg			
	100	105	110

Tyr	Leu	Tyr	Leu	Leu	Thr	Leu	Ala	Leu	Gln	Met	Ala	Cys	Tyr	Tyr	Leu	115	120	125
Leu	His	Leu	Pro	Pro	Trp	Cys	Val	Val	Leu	Ala	Cys	Leu	Ser	Lys	Arg	130	135	140
Leu	His	Ser	Ile	Tyr	Val	Leu	Arg	Leu	Phe	Asn	Asp	Cys	Phe	Thr	Thr	145	150	155
Leu	Phe	Met	Val	Val	Thr	Val	Leu	Gly	Ala	Ile	Val	Ala	Ser	Arg	Cys	165	170	175
His	Gln	Arg	Pro	Lys	Leu	Lys	Lys	Ser	Leu	Ala	Leu	Val	Ile	Ser	Ala	180	185	190
Thr	Tyr	Ser	Met	Ala	Val	Ser	Ile	Lys	Met	Asn	Ala	Leu	Leu	Tyr	Phe	195	200	205
Pro	Ala	Met	Met	Ile	Ser	Leu	Phe	Ile	Leu	Asn	Asp	Ala	Asn	Val	Ile	210	215	220
Leu	Thr	Leu	Leu	Asp	Leu	Val	Ala	Met	Ile	Ala	Trp	Gln	Val	Ala	Val	225	230	235
Ala	Val	Pro	Phe	Leu	Arg	Ser	Phe	Pro	Gln	Gln	Tyr	Leu	His	Cys	Ala	245	250	255
Phe	Asn	Phe	Gly	Arg	Lys	Phe	Met	Tyr	Gln	Trp	Ser	Ile	Asn	Trp	Gln	260	265	270
Met	Met	Asp	Glu	Glu	Ala	Phe	Asn	Asp	Lys	Arg	Phe	His	Leu	Ala	Leu	275	280	285
Leu	Ile	Ser	His	Leu	Ile	Ala	Leu	Thr	Thr	Leu	Phe	Val	Thr	Arg	Tyr	290	295	300
Pro	Arg	Ile	Leu	Pro	Asp	Leu	Trp	Ser	Ser	Leu	Cys	His	Pro	Leu	Arg	305	310	315
Lys	Asn	Ala	Val	Leu	Asn	Ala	Asn	Pro	Ala	Lys	Thr	Ile	Pro	Phe	Val	325	330	335
Leu	Ile	Ala	Ser	Asn	Phe	Ile	Gly	Val	Leu	Phe	Ser	Arg	Ser	Leu	His	340	345	350
Tyr	Gln	Phe	Leu	Ser	Trp	Tyr	His	Trp	Thr	Leu	Pro	Ile	Leu	Ile	Phe	355	360	365
Trp	Ser	Gly	Met	Pro	Phe	Phe	Val	Gly	Pro	Ile	Trp	Tyr	Val	Leu	His	370	375	380
Glu	Trp	Cys	Trp	Asn	Ser	Tyr	Pro	Pro	Asn	Ser	Gln	Ala	Ser			385	390	395

<210> 38  
 <211> 387  
 <212> PRT  
 <213> *Pichia pastoris*

<220>  
 <221> MOD\_RES  
 <222> (183)...(197)  
 <223> Xaa is a variable amino acid

<220>  
 <221> MOD\_RES  
 <222> (209)...(220)  
 <223> Xaa is a variable amino acid

<400> 38  
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 Tyr Met Gln Gln Ile Phe Lys Ile Arg Gln Gly Glu Leu Asp Tyr Ser  
 35 40 45  
 Asn Ile Phe Gly Asp Thr Gly Pro Leu Val Tyr Pro Ala Gly His Val  
 50 55 60  
 His Ala Tyr Ser Val Leu Ser Trp Tyr Ser Asp Gly Gly Glu Asp Val  
 65 70 75 80  
 Ser Phe Val Gln Gln Ala Phe Gly Trp Leu Tyr Leu Gly Cys Leu Leu  
 85 90 95  
 Leu Ser Ile Ser Ser Tyr Phe Phe Ser Gly Leu Gly Lys Ile Pro Pro  
 100 105 110  
 Val Tyr Phe Val Leu Leu Val Ala Ser Lys Arg Leu His Ser Ile Phe  
 115 120 125  
 Val Leu Arg Leu Phe Asn Asp Cys Leu Thr Thr Phe Leu Met Leu Ala  
 130 135 140  
 Thr Ile Ile Ile Leu Gln Gln Ala Ser Ser Trp Arg Lys Asp Gly Thr  
 145 150 155 160

Thr Ile Pro Leu Ser Val Pro Asp Ala Ala Asp Thr Tyr Ser Leu Ala  
 165 170 175  
 Ile Ser Val Lys Met Asn Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 180 185 190  
 Xaa Xaa Xaa Xaa Xaa Cys Asp Glu Asn Leu Ile Lys Ala Leu Ala Pro  
 195 200 205  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Ser Phe Ile  
 210 215 220  
 Leu Pro Leu His Tyr Asp Asp Gln Ala Asn Glu Ile Arg Ser Ala Tyr  
 225 230 235 240  
 Phe Arg Gln Ala Phe Asp Phe Ser Arg Gln Phe Leu Tyr Lys Trp Thr  
 245 250 255  
 Val Asn Trp Arg Phe Leu Ser Gln Glu Thr Phe Asn Asn Val His Phe  
 260 265 270  
 His Gln Leu Leu Phe Ala Leu His Ile Ile Thr Leu Val Leu Phe Ile  
 275 280 285  
 Pro Leu Gly Arg Phe Val Leu Asp Ile Phe Lys Phe Trp Lys Pro Thr  
 290 295 300  
 Leu Ser Pro Thr Asn Ile Ile Asn Asp Pro Glu Arg Ser Pro Asp Phe  
 305 310 315 320  
 Val Tyr Thr Val Met Ala Thr Thr Asn Leu Ile Gly Val Leu Phe Ala  
 325 330 335  
 Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr Ala Phe Ser Leu Pro  
 340 345 350  
 Tyr Leu Leu Tyr Lys Ala Arg Leu Asn Phe Ile Ala Ser Ile Ile Val  
 355 360 365  
 Tyr Ala Ala His Glu Tyr Cys Trp Leu Val Phe Pro Ala Thr Glu Gln  
 370 375 380  
 Ser Ser Ala  
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<210> 39

<211> 373

<212> PRT

<213> Neurospora crassa

<400> 39

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			20					25					30		
Tyr	Met	Glu	Gln	Val	Ser	Gln	Ile	Leu	Ser	Gly	Glu	Arg	Asp	Tyr	Thr
		35					40					45			
Lys	Val	Arg	Gly	Gly	Thr	Gly	Pro	Leu	Val	Tyr	Pro	Ala	Ala	His	Val
	50					55				60					
Tyr	Ile	Tyr	Thr	Gly	Leu	Tyr	His	Leu	Thr	Asp	Glu	Gly	Arg	Asn	Ile
65					70				75					80	
Leu	Leu	Ala	Gln	Gln	Leu	Phe	Ala	Gly	Leu	Tyr	Met	Val	Thr	Leu	Ala
			85						90					95	
Val	Val	Met	Gly	Cys	Tyr	Trp	Gln	Ala	Lys	Ala	Pro	Pro	Tyr	Leu	Phe
		100						105					110		
Pro	Leu	Leu	Thr	Leu	Ser	Lys	Arg	Leu	His	Ser	Ile	Phe	Val	Leu	Arg
		115					120					125			
Cys	Phe	Asn	Asp	Cys	Phe	Ala	Val	Leu	Phe	Leu	Trp	Leu	Ala	Ile	Phe
	130					135					140				
Phe	Phe	Gln	Arg	Arg	Asn	Trp	Gln	Ala	Gly	Ala	Leu	Leu	Tyr	Thr	Leu
145				150					155					160	
Gly	Leu	Gly	Val	Lys	Met	Thr	Leu	Leu	Leu	Ser	Leu	Pro	Ala	Val	Gly
			165					170					175		
Ile	Val	Leu	Phe	Leu	Gly	Ser	Gly	Ser	Phe	Val	Thr	Thr	Leu	Gln	Leu
		180					185						190		
Val	Ala	Thr	Met	Gly	Leu	Val	Gln	Ile	Leu	Ile	Gly	Val	Pro	Phe	Leu
		195					200					205			
Ala	His	Tyr	Pro	Thr	Glu	Tyr	Leu	Ser	Arg	Ala	Phe	Glu	Leu	Ser	Arg
	210					215					220				
Gln	Phe	Phe	Phe	Lys	Trp	Thr	Val	Asn	Trp	Arg	Phe	Val	Gly	Glu	Glu
225				230					235					240	
Ile	Phe	Leu	Ser	Lys	Gly	Phe	Ala	Leu	Thr	Leu	Leu	Ala	Leu	His	Val
			245					250					255		
Leu	Val	Leu	Gly	Ile	Phe	Ile	Thr	Thr	Arg	Trp	Ile	Lys	Pro	Ala	Arg
		260					265					270			
Lys	Ser	Leu	Val	Gln	Leu	Ile	Ser	Pro	Val	Leu	Leu	Ala	Gly	Lys	Pro
		275					280					285			

```

Pro Leu Thr Val Pro Glu His Arg Ala Ala Ala Arg Asp Val Thr Pro
    290                      295                      300
Arg Tyr Ile Met Thr Thr Ile Leu Ser Ala Asn Ala Val Gly Leu Leu
305                      310                      315                      320
Phe Ala Arg Ser Leu His Tyr Gln Phe Tyr Ala Tyr Val Ala Trp Ser
                      325                      330                      335
Thr Pro Phe Leu Leu Trp Arg Ala Gly Leu His Pro Val Leu Val Tyr
                      340                      345                      350
Leu Leu Trp Ala Val His Glu Trp Ala Trp Asn Val Phe Pro Ser Thr
                      355                      360                      365
Pro Ala Ser Ser Ala
    370

```

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<210> 40
<211> 374
<212> PRT
<213> Pichia pastoris

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<220>
<221> MOD_RES
<222> (160)...(174)
<223> Xaa is a variable amino acid

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<220>
<221> MOD_RES
<222> (186)...(197)
<223> Xaa is a variable amino acid

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<400> 40
Ser Tyr Thr Asp Ile Asp Phe Ser Ser Tyr Met Gln Gln Ile Phe Lys
  1                      5                      10                      15
Ile Arg Gln Gly Glu Leu Asp Tyr Ser Asn Ile Phe Gly Asp Thr Gly
                      20                      25                      30
Pro Leu Val Tyr Pro Ala Gly His Val His Ala Tyr Ser Val Leu Ser
                      35                      40                      45
Trp Tyr Ser Asp Gly Gly Glu Asp Val Ser Phe Val Gln Gln Ala Phe

```



50	55	60
Gly Trp Leu Tyr Leu	Gly Cys Leu Leu Leu	Ser Ile Ser Ser Tyr Phe
65	70	75 80
Phe Ser Gly Leu Gly	Lys Ile Pro Pro Val	Tyr Phe Val Leu Leu Val
85	90	95
Ala Ser Lys Arg Leu	His Ser Ile Phe Val	Leu Arg Leu Phe Asn Asp
100	105	110
Cys Leu Thr Thr Phe	Leu Met Leu Ala Thr	Ile Ile Ile Leu Gln Gln
115	120	125
Ala Ser Ser Trp Arg	Lys Asp Gly Thr Thr	Ile Pro Leu Ser Val Pro
130	135	140
Asp Ala Ala Asp Thr	Tyr Ser Leu Ala Ile	Ser Val Lys Met Asn Xaa
145	150	155 160
Xaa Xaa Xaa Xaa Xaa	Xaa Xaa Xaa Xaa Xaa	Xaa Xaa Xaa Xaa Cys Asp
165	170	175
Glu Asn Leu Ile Lys	Ala Leu Ala Pro Xaa	Xaa Xaa Xaa Xaa Xaa Xaa
180	185	190
Xaa Xaa Xaa Xaa Xaa	Tyr Ser Phe Ile Leu	Pro Leu His Tyr Asp Asp
195	200	205
Gln Ala Asn Glu Ile	Arg Ser Ala Tyr Phe	Arg Gln Ala Phe Asp Phe
210	215	220
Ser Arg Gln Phe Leu	Tyr Lys Trp Thr Val	Asn Trp Arg Phe Leu Ser
225	230	235 240
Gln Glu Thr Phe Asn	Asn Val His Phe His	Gln Leu Leu Phe Ala Leu
245	250	255
His Ile Ile Thr Leu	Val Leu Phe Ile Leu	Lys Phe Leu Ser Pro Lys
260	265	270
Asn Ile Gly Lys Pro	Leu Gly Arg Phe Val	Leu Asp Ile Phe Lys Phe
275	280	285
Trp Lys Pro Thr Leu	Ser Pro Thr Asn Ile	Ile Asn Asp Pro Glu Arg
290	295	300
Ser Pro Asp Phe Val	Tyr Thr Val Met Ala	Thr Thr Asn Leu Ile Gly
305	310	315 320
Val Leu Phe Ala Arg	Ser Leu His Tyr Gln	Phe Leu Ser Trp Tyr Ala
325	330	335
Phe Ser Leu Pro Tyr	Leu Leu Tyr Lys Ala	Arg Leu Asn Phe Ile Ala
340	345	350

Ser Ile Ile Val Tyr Ala Ala His Glu Tyr Cys Trp Leu Val Phe Pro  
                   355                                  360                                  365  
 Ala Thr Glu Gln Ser Ser  
                   370

<210> 41

<211> 355

<212> PRT

<213> Schizosaccharomyces pombe

<400> 41

Leu Leu Leu Leu Glu Ile Pro Phe Val Phe Ala Ile Ile Ser Lys Val  
   1                  5                                  10                                  15  
 Pro Tyr Thr Glu Ile Asp Trp Ile Ala Tyr Met Glu Gln Val Asn Ser  
                   20                                  25                                  30  
 Phe Leu Leu Gly Glu Arg Asp Tyr Lys Ser Leu Val Gly Cys Thr Gly  
                   35                                  40                                  45  
 Pro Leu Val Tyr Pro Gly Gly His Val Phe Leu Tyr Thr Leu Leu Tyr  
                   50                                  55                                  60  
 Tyr Leu Thr Asp Gly Gly Thr Asn Ile Val Arg Ala Gln Tyr Ile Phe  
   65                                  70                                  75                                  80  
 Ala Phe Val Tyr Trp Ile Thr Thr Ala Ile Val Gly Tyr Leu Phe Lys  
                   85                                  90                                  95  
 Ile Val Arg Ala Pro Phe Tyr Ile Tyr Val Leu Leu Ile Leu Ser Lys  
                   100                                  105                                  110  
 Arg Leu His Ser Ile Phe Ile Leu Arg Leu Phe Asn Asp Gly Phe Asn  
                   115                                  120                                  125  
 Ser Leu Phe Ser Ser Leu Phe Ile Leu Ser Ser Cys Lys Lys Lys Trp  
                   130                                  135                                  140  
 Val Arg Ala Ser Ile Leu Leu Ser Val Ala Cys Ser Val Lys Met Ser  
   145                                  150                                  155                                  160  
 Ser Leu Leu Tyr Val Pro Ala Tyr Leu Val Leu Leu Leu Gln Ile Leu  
                   165                                  170                                  175  
 Gly Pro Lys Lys Thr Trp Met His Ile Phe Val Ile Ile Ile Val Gln  
                   180                                  185                                  190  
 Ile Leu Phe Ser Ile Pro Phe Leu Ala Tyr Phe Trp Ser Tyr Trp Thr

195	200	205
Gln Ala Phe Asp Phe Gly Arg Ala Phe Asp Tyr Lys Trp Thr Val Asn		
210	215	220
Trp Arg Phe Ile Pro Arg Ser Ile Phe Glu Ser Thr Ser Phe Ser Thr		
225	230	235
Ser Ile Leu Phe Leu His Val Ala Leu Leu Val Ala Phe Thr Cys Lys		
245	250	255
His Trp Asn Lys Leu Ser Arg Ala Thr Pro Phe Ala Met Val Asn Ser		
260	265	270
Met Leu Thr Leu Lys Pro Leu Pro Lys Leu Gln Leu Ala Thr Pro Asn		
275	280	285
Phe Ile Phe Thr Ala Leu Ala Thr Ser Asn Leu Ile Gly Ile Leu Cys		
290	295	300
Ala Arg Ser Leu His Tyr Gln Phe Tyr Ala Trp Phe Ala Trp Tyr Ser		
305	310	315
Pro Tyr Leu Cys Tyr Gln Ala Ser Phe Pro Ala Pro Ile Val Ile Gly		
325	330	335
Leu Trp Met Leu Gln Glu Tyr Ala Trp Asn Val Phe Pro Ser Thr Lys		
340	345	350
Leu Ser Ser		
355		

<210> 42  
 <211> 390  
 <212> PRT  
 <213> *Pichia pastoris*

<220>  
 <221> MOD\_RES  
 <222> (176)...(190)  
 <223> Xaa is a variable amino acid

<220>  
 <221> MOD\_RES  
 <222> (202)...(213)  
 <223> Xaa is a variable amino acid

<400> 42

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Leu Trp Leu Ala Asp Ser Ile Val Ile Lys Val Ile Ile Gly Thr Val
 1           5           10           15
Ser Tyr Thr Asp Ile Asp Phe Ser Ser Tyr Met Gln Gln Ile Phe Lys
          20           25           30
Ile Arg Gln Gly Glu Leu Asp Tyr Ser Asn Ile Phe Gly Asp Thr Gly
          35           40           45
Pro Leu Val Tyr Pro Ala Gly His Val His Ala Tyr Ser Val Leu Ser
          50           55           60
Trp Tyr Ser Asp Gly Gly Glu Asp Val Ser Phe Val Gln Gln Ala Phe
65           70           75           80
Gly Trp Leu Tyr Leu Gly Cys Leu Leu Leu Ser Ile Ser Ser Tyr Phe
          85           90           95
Phe Ser Gly Leu Gly Lys Ile Pro Pro Val Tyr Phe Val Leu Leu Val
          100          105          110
Ala Ser Lys Arg Leu His Ser Ile Phe Val Leu Arg Leu Phe Asn Asp
          115          120          125
Cys Leu Thr Thr Phe Leu Met Leu Ala Thr Ile Ile Ile Leu Gln Gln
          130          135          140
Ala Ser Ser Trp Arg Lys Asp Gly Thr Thr Ile Pro Leu Ser Val Pro
145          150          155          160
Asp Ala Ala Asp Thr Tyr Ser Leu Ala Ile Ser Val Lys Met Asn Xaa
          165          170          175
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Asp
          180          185          190
Glu Asn Leu Ile Lys Ala Leu Ala Pro Xaa Xaa Xaa Xaa Xaa Xaa Xaa
          195          200          205
Xaa Xaa Xaa Xaa Xaa Tyr Ser Phe Ile Leu Pro Leu His Tyr Asp Asp
          210          215          220
Gln Ala Asn Glu Ile Arg Ser Ala Tyr Phe Arg Gln Ala Phe Asp Phe
225          230          235          240
Ser Arg Gln Phe Leu Tyr Lys Trp Thr Val Asn Trp Arg Phe Leu Ser
          245          250          255
Gln Glu Thr Phe Asn Asn Val His Phe His Gln Leu Leu Phe Ala Leu
          260          265          270
His Ile Ile Thr Leu Val Leu Phe Ile Leu Lys Phe Leu Ser Pro Lys

```

275	280	285
Asn Ile Gly Lys Pro Leu Gly Arg Phe Val Leu Asp Ile Phe Lys Phe		
290	295	300
Trp Lys Pro Thr Leu Ser Pro Thr Asn Ile Ile Asn Asp Pro Glu Arg		
305	310	315
Ser Pro Asp Phe Val Tyr Thr Val Met Ala Thr Thr Asn Leu Ile Gly		
325	330	335
Val Leu Phe Ala Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr Ala		
340	345	350
Phe Ser Leu Pro Tyr Leu Leu Tyr Lys Ala Arg Leu Asn Phe Ile Ala		
355	360	365
Ser Ile Ile Val Tyr Ala Ala His Glu Tyr Cys Trp Leu Val Phe Pro		
370	375	380
Ala Thr Glu Gln Ser Ser		
385	390	

<210> 43

<211> 363

<212> PRT

<213> Arabidopsis thaliana

<400> 43

Leu Ile Leu Ala Asp Ala Ile Leu Val Ala Leu Ile Ile Ala Tyr Val
1 5 10 15
Pro Tyr Thr Lys Ile Asp Trp Asp Ala Tyr Met Ser Gln Val Ser Gly
20 25 30
Phe Leu Gly Gly Glu Arg Asp Tyr Gly Asn Leu Lys Gly Asp Thr Gly
35 40 45
Pro Leu Val Tyr Pro Ala Gly Phe Leu Tyr Val Tyr Ser Ala Val Gln
50 55 60
Asn Leu Thr Gly Gly Glu Val Tyr Pro Ala Gln Ile Leu Phe Gly Val
65 70 75 80
Leu Tyr Ile Val Asn Leu Gly Ile Val Leu Ile Ile Tyr Val Lys Thr
85 90 95
Asp Val Val Pro Trp Trp Ala Leu Ser Leu Leu Cys Leu Ser Lys Arg
100 105 110

Ile	His	Ser	Ile	Phe	Val	Leu	Arg	Leu	Phe	Asn	Asp	Cys	Phe	Ala	Met			
			115						120				125					
Thr	Leu	Leu	His	Ala	Ser	Met	Ala	Leu	Phe	Leu	Tyr	Arg	Lys	Trp	His			
			130				135					140						
Leu	Gly	Met	Leu	Val	Phe	Ser	Gly	Ala	Val	Ser	Val	Lys	Met	Asn	Val			
			145				150					155			160			
Leu	Leu	Tyr	Ala	Pro	Thr	Leu	Leu	Leu	Leu	Leu	Leu	Lys	Ala	Met	Asn			
							165				170				175			
Ile	Ile	Gly	Val	Val	Ser	Ala	Leu	Ala	Gly	Ala	Ala	Leu	Ala	Gln	Ile			
			180						185					190				
Leu	Val	Gly	Leu	Pro	Phe	Leu	Ile	Thr	Tyr	Pro	Val	Ser	Tyr	Ile	Ala			
			195					200					205					
Asn	Ala	Phe	Asp	Leu	Gly	Arg	Val	Phe	Ile	His	Phe	Trp	Ser	Val	Asn			
			210				215					220						
Phe	Lys	Phe	Val	Pro	Glu	Arg	Val	Phe	Val	Ser	Lys	Glu	Phe	Ala	Val			
			225				230				235				240			
Cys	Leu	Leu	Ile	Ala	His	Leu	Phe	Leu	Leu	Val	Ala	Phe	Ala	Asn	Tyr			
							245				250				255			
Lys	Trp	Cys	Lys	His	Glu	Gly	Gly	Ile	Ile	Gly	Phe	Met	Arg	Ser	Arg			
			260					265						270				
His	Phe	Phe	Leu	Thr	Leu	Pro	Ser	Ser	Leu	Ser	Phe	Ser	Asp	Val	Ser			
			275					280					285					
Ala	Ser	Arg	Ile	Ile	Thr	Lys	Glu	His	Val	Val	Thr	Ala	Met	Phe	Val			
			290				295					300						
Gly	Asn	Phe	Ile	Gly	Ile	Val	Phe	Ala	Arg	Ser	Leu	His	Tyr	Gln	Phe			
			305				310				315				320			
Tyr	Ser	Trp	Tyr	Phe	Tyr	Ser	Leu	Pro	Tyr	Leu	Leu	Trp	Arg	Thr	Pro			
							325				330				335			
Phe	Pro	Thr	Trp	Leu	Arg	Leu	Ile	Met	Phe	Leu	Gly	Ile	Glu	Leu	Cys			
							340				345				350			
Trp	Asn	Val	Tyr	Pro	Ser	Thr	Pro	Ser	Ser	Ser								
			355					360										

<210> 44

<211> 428

<212> DNA

<213> Kluyveromyces lactis

<400> 44

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tttgtttaca agctgatacc aacgaacatg aatacaccgg caggtttact gaagattggc 60
aaagctaacc ttttacatcc ttttaccgat gctgtattca gtgcgatgag agtaaacgca 120
gaacaaattg catacatttt acttggtacc aattacattg gagtactatt tgctcgatca 180
ttacactacc aattcctatc ttggtaccat tggacgttac cagtactatt gaattgggccc 240
aatgttccgt atccgctatg tgtgctatgg tacctaacac atgagtgggtg ctggaacagc 300
tatccgccaa acgctactgc atccacactg ctacacgcgt gtaacacata ctgttattgg 360
ctgtattctt aagaggaccc gcaaactcga aaagtgggtga taacgaaaca acacacgaga 420
aagctgag

```

<210> 45

<211> 141

<212> PRT

<213> Kluyveromyces lactis

<400> 45

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Phe Val Tyr Lys Leu Ile Pro Thr Asn Met Asn Thr Pro Ala Gly Leu
 1             5             10             15
Leu Lys Ile Gly Lys Ala Asn Leu Leu His Pro Phe Thr Asp Ala Val
      20             25             30
Phe Ser Ala Met Arg Val Asn Ala Glu Gln Ile Ala Tyr Ile Leu Leu
      35             40             45
Val Thr Asn Tyr Ile Gly Val Leu Phe Ala Arg Ser Leu His Tyr Gln
      50             55             60
Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Val Leu Leu Asn Trp Ala
65             70             75             80
Asn Val Pro Tyr Pro Leu Cys Val Leu Trp Tyr Leu Thr His Glu Trp
      85             90             95
Cys Trp Asn Ser Tyr Pro Pro Asn Ala Thr Ala Ser Thr Leu Leu His
      100            105            110
Ala Cys Asn Thr Tyr Cys Tyr Trp Leu Tyr Ser Glu Asp Pro Gln Thr
      115            120            125
Arg Lys Val Val Ile Thr Lys Gln His Thr Arg Lys Leu
      130            135            140

```

<210> 46  
 <211> 118  
 <212> PRT  
 <213> Kluyveromyces lactis

<400> 46  
 Ala Asn Leu Leu His Pro Phe Thr Asp Ala Val Phe Ser Ala Met Arg  
 1 5 10 15  
 Val Asn Ala Glu Gln Ile Ala Tyr Ile Leu Leu Val Thr Asn Tyr Ile  
 20 25 30  
 Gly Val Leu Phe Ala Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr  
 35 40 45  
 His Trp Thr Leu Pro Val Leu Leu Asn Trp Ala Asn Val Pro Tyr Pro  
 50 55 60  
 Leu Cys Val Leu Trp Tyr Leu Thr His Glu Trp Cys Trp Asn Ser Tyr  
 65 70 75 80  
 Pro Pro Asn Ala Thr Ala Ser Thr Leu Leu His Ala Cys Asn Thr Tyr  
 85 90 95  
 Cys Tyr Trp Leu Tyr Ser Glu Asp Pro Gln Thr Arg Lys Val Val Ile  
 100 105 110  
 Thr Lys Gln His Thr Arg  
 115

<210> 47  
 <211> 117  
 <212> PRT  
 <213> Saccharomyces cerevisiae

<400> 47  
 Ser Ser Leu Cys His Pro Leu Arg Lys Asn Ala Val Leu Asn Ala Asn  
 1 5 10 15  
 Pro Ala Lys Thr Ile Pro Phe Val Leu Ile Ala Ser Asn Phe Ile Gly  
 20 25 30  
 Val Leu Phe Ser Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His  
 35 40 45



Trp Thr Leu Pro Ile Leu Ile Phe Trp Ser Gly Met Pro Phe Phe Val  
 50 55 60  
 Gly Pro Ile Trp Tyr Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro  
 65 70 75 80  
 Pro Asn Ser Gln Ala Ser Thr Leu Leu Leu Ala Leu Asn Thr Val Leu  
 85 90 95  
 Leu Leu Leu Leu Ala Leu Thr Gln Leu Ser Gly Ser Val Ala Leu Ala  
 100 105 110  
 Lys Ser His Leu Arg  
 115

<210> 48  
 <211> 113  
 <212> PRT  
 <213> Kluyveromyces lactis

<400> 48  
 Phe Thr Asp Ala Val Phe Ser Ala Met Arg Val Asn Ala Glu Gln Ile  
 1 5 10 15  
 Ala Tyr Ile Leu Leu Val Thr Asn Tyr Ile Gly Val Leu Phe Ala Arg  
 20 25 30  
 Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro Val  
 35 40 45  
 Leu Leu Asn Trp Ala Asn Val Pro Tyr Pro Leu Cys Val Leu Trp Tyr  
 50 55 60  
 Leu Thr His Glu Trp Cys Trp Asn Ser Tyr Pro Pro Asn Ala Thr Ala  
 65 70 75 80  
 Ser Thr Leu Leu His Ala Cys Asn Thr Tyr Cys Tyr Trp Leu Tyr Ser  
 85 90 95  
 Glu Asp Pro Gln Thr Arg Lys Val Val Ile Thr Lys Gln His Thr Arg  
 100 105 110  
 Lys

<210> 49

<211> 106

<212> PRT

<213> Arabidopsis thaliana

<400> 49

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Phe Ser Asp Val Ser Ala Ser Arg Ile Ile Thr Lys Glu His Val Val
 1           5           10           15
Thr Ala Met Phe Val Gly Asn Phe Ile Gly Ile Val Phe Ala Arg Ser
      20           25           30
Leu His Tyr Gln Phe Tyr Ser Trp Tyr Phe Tyr Ser Leu Pro Tyr Leu
      35           40           45
Leu Trp Arg Thr Pro Phe Pro Thr Trp Leu Arg Leu Ile Met Phe Leu
      50           55           60
Gly Ile Glu Leu Cys Trp Asn Val Tyr Pro Ser Thr Pro Ser Ser Ser
65           70           75           80
Gly Leu Leu Leu Cys Leu His Leu Ile Ile Leu Val Gly Leu Trp Leu
      85           90           95
Ala Pro Ser Val Asp Pro Tyr Gln Leu Lys
      100           105

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<210> 50

<211> 1668

<212> DNA

<213> Saccharomyces cerevisiae

<400> 50

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atgaattgca aggcggtaac cattagttta ttactgttgt tatttttaac aagagtatat 60
attcagccga cattctcggt aatttcagat tgcatgaaa cttttaatta ttgggaacca 120
ttaaatttat tggtagctgg atttggtaaa caaacctggg aatattcacc cgagtattct 180
attagatcat gggctttctt attacctttt tactgtattc tttatccagt aaacaaattt 240
actgacctag aaagtcattg gaactttttc atcacaagag catgcttagg cttttttagt 300
tttatcatgg aatttaaact acatcgtgaa attgcaggca gcttggcatt gcaaatacgca 360
aatatttgga ttattttcca attgtttaat cggggtggt tccatgcac tgtggaatta 420
ttgccttctg ccgttgccat gttgttgtat gtaggtgcca ccagacactc tctacgctat 480
ctgtccactg ggtctacttc taactttacg aaaagtttag cgtacaattt cctggctagt 540
atactagggt ggccatttgt tttaatttta agcttgccat tatgtttaca ttaccttttc 600

```

```

aaccatagaa ttatttctac catcagaacc gcattcgact gctgtttgat attttcattg 660
actgcatttg ctgtgattgt cactgacagt atatttttacg ggaagcttgc tcctgtatca 720
tggaacatct tattttacaa tgtcattaat gcaagtgagg aatctggccc aaatattttc 780
ggggttgagc catggtacta ctatccacta aatttggttac tgaatttccc actgcctgtg 840
ctagttttag ctattttggg aattttccat ttgagattat ggccattatg ggcatcatta 900
ttcacatgga ttgccgtttt cactcaacaa cctcacaaag aggaaagatt tctctatcca 960
atttacgggt taataacttt gagtgaagt atcgctttt acaaagtgtt gaatctattc 1020
aatagaaagc cgattcttaa aaaagggtata aagttgtcag ttttattaat tgttgcaggc 1080
caggcaatgt cacggatagt ggctttgggtg aacaattaca cagctcctat agccgtctac 1140
gagcaatttt cttcactaaa tcaagggtgt gtgaaggcac cggtagtga tgtatgtacg 1200
ggacgtgaat ggtatcactt cccaagttct ttctgctgc cagataatca taggctaaaa 1260
tttgttaaat ctggatttga tggctcttct ccagggtgatt ttccagagag tggttctatt 1320
ttcaaaaaga ttagaacttt acctaaggga atgaataaca agaatatata tgataccggg 1380
aaagagtggc cgatcactag atgtgattat ttatttgaca tcgtcgcccc aataaattta 1440
acaaaagacg ttttcaaccc tctacatctg atggataact ggaataagct ggcatgtgct 1500
gcattcatcg acggtgaaaa ttctaagatt ttgggtagag cattttacgt accggagcca 1560
atcaaccgaa tcatgcaa atgtttacca aaacaatgga atcaagtgt cgggtgttcgt 1620
tacattgatt actgtttgtt tgaaaaacca actgagacta ctaattga 1668

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<210> 51

<211> 555

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 51

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Met Asn Cys Lys Ala Val Thr Ile Ser Leu Leu Leu Leu Phe Leu
  1             5             10             15
Thr Arg Val Tyr Ile Gln Pro Thr Phe Ser Leu Ile Ser Asp Cys Asp
      20             25             30
Glu Thr Phe Asn Tyr Trp Glu Pro Leu Asn Leu Leu Val Arg Gly Phe
      35             40             45
Gly Lys Gln Thr Trp Glu Tyr Ser Pro Glu Tyr Ser Ile Arg Ser Trp
      50             55             60
Ala Phe Leu Leu Pro Phe Tyr Cys Ile Leu Tyr Pro Val Asn Lys Phe
      65             70             75             80
Thr Asp Leu Glu Ser His Trp Asn Phe Phe Ile Thr Arg Ala Cys Leu
      85             90             95

```

Gly	Phe	Phe	Ser	Phe	Ile	Met	Glu	Phe	Lys	Leu	His	Arg	Glu	Ile	Ala
			100						105					110	
Gly	Ser	Leu	Ala	Leu	Gln	Ile	Ala	Asn	Ile	Trp	Ile	Ile	Phe	Gln	Leu
			115						120					125	
Phe	Asn	Pro	Gly	Trp	Phe	His	Ala	Ser	Val	Glu	Leu	Leu	Pro	Ser	Ala
			130						135					140	
Val	Ala	Met	Leu	Leu	Tyr	Val	Gly	Ala	Thr	Arg	His	Ser	Leu	Arg	Tyr
145					150					155					160
Leu	Ser	Thr	Gly	Ser	Thr	Ser	Asn	Phe	Thr	Lys	Ser	Leu	Ala	Tyr	Asn
					165					170					175
Phe	Leu	Ala	Ser	Ile	Leu	Gly	Trp	Pro	Phe	Val	Leu	Ile	Leu	Ser	Leu
					180					185				190	
Pro	Leu	Cys	Leu	His	Tyr	Leu	Phe	Asn	His	Arg	Ile	Ile	Ser	Thr	Ile
			195						200					205	
Arg	Thr	Ala	Phe	Asp	Cys	Cys	Leu	Ile	Phe	Ser	Leu	Thr	Ala	Phe	Ala
			210						215					220	
Val	Ile	Val	Thr	Asp	Ser	Ile	Phe	Tyr	Gly	Lys	Leu	Ala	Pro	Val	Ser
225					230					235					240
Trp	Asn	Ile	Leu	Phe	Tyr	Asn	Val	Ile	Asn	Ala	Ser	Glu	Glu	Ser	Gly
					245					250					255
Pro	Asn	Ile	Phe	Gly	Val	Glu	Pro	Trp	Tyr	Tyr	Tyr	Pro	Leu	Asn	Leu
					260					265				270	
Leu	Leu	Asn	Phe	Pro	Leu	Pro	Val	Leu	Val	Leu	Ala	Ile	Leu	Gly	Ile
					275					280				285	
Phe	His	Leu	Arg	Leu	Trp	Pro	Leu	Trp	Ala	Ser	Leu	Phe	Thr	Trp	Ile
					290					295				300	
Ala	Val	Phe	Thr	Gln	Gln	Pro	His	Lys	Glu	Glu	Arg	Phe	Leu	Tyr	Pro
305					310					315					320
Ile	Tyr	Gly	Leu	Ile	Thr	Leu	Ser	Ala	Ser	Ile	Ala	Phe	Tyr	Lys	Val
					325					330				335	
Leu	Asn	Leu	Phe	Asn	Arg	Lys	Pro	Ile	Leu	Lys	Lys	Gly	Ile	Lys	Leu
					340					345				350	
Ser	Val	Leu	Leu	Ile	Val	Ala	Gly	Gln	Ala	Met	Ser	Arg	Ile	Val	Ala
					355					360				365	
Leu	Val	Asn	Asn	Tyr	Thr	Ala	Pro	Ile	Ala	Val	Tyr	Glu	Gln	Phe	Ser
					370					375				380	
Ser	Leu	Asn	Gln	Gly	Gly	Val	Lys	Ala	Pro	Val	Val	Asn	Val	Cys	Thr

385		390		395		400									
Gly	Arg	Glu	Trp	Tyr	His	Phe	Pro	Ser	Ser	Phe	Leu	Leu	Pro	Asp	Asn
		405				410								415	
His	Arg	Leu	Lys	Phe	Val	Lys	Ser	Gly	Phe	Asp	Gly	Leu	Leu	Pro	Gly
		420						425						430	
Asp	Phe	Pro	Glu	Ser	Gly	Ser	Ile	Phe	Lys	Lys	Ile	Arg	Thr	Leu	Pro
		435						440						445	
Lys	Gly	Met	Asn	Asn	Lys	Asn	Ile	Tyr	Asp	Thr	Gly	Lys	Glu	Trp	Pro
		450						455						460	
Ile	Thr	Arg	Cys	Asp	Tyr	Phe	Ile	Asp	Ile	Val	Ala	Pro	Ile	Asn	Leu
465				470						475				480	
Thr	Lys	Asp	Val	Phe	Asn	Pro	Leu	His	Leu	Met	Asp	Asn	Trp	Asn	Lys
				485						490				495	
Leu	Ala	Cys	Ala	Ala	Phe	Ile	Asp	Gly	Glu	Asn	Ser	Lys	Ile	Leu	Gly
		500								505				510	
Arg	Ala	Phe	Tyr	Val	Pro	Glu	Pro	Ile	Asn	Arg	Ile	Met	Gln	Ile	Val
		515						520					525		
Leu	Pro	Lys	Gln	Trp	Asn	Gln	Val	Tyr	Gly	Val	Arg	Tyr	Ile	Asp	Tyr
		530						535					540		
Cys	Leu	Phe	Glu	Lys	Pro	Thr	Glu	Thr	Thr	Asn					
545				550						555					

<210> 52

<211> 600

<212> DNA

<213> *Pichia pastoris*

<400> 52

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atttcagact gtgatgaagt gttcaactac tgggagccac tcaacttcat gcttagaggg 180
tttgaaaaac agacttggga gtattctcca gagtatgcca tccgatcttg gtcctatcta 240
gtgccacttt ggatagcagg ctatccacca ttgttcttgg atatcccttc ttactacttt 300
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catagtttga agaaaaatgt cagcagtaag atcagtttct ggtaccttct atttacaacc 420
gttgctccag gaatgtctca tagcacgata gccttattac catcctcttt tgctatgggt 480

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tgtcacactt ttgccattag atacgtcatt gattacctac aattaccaac attaatgcgc 540  
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<210> 53

<211> 199

<212> PRT

<213> *Pichia pastoris*

<400> 53

Trp	Pro	Ser	Cys	Leu	Leu	Asp	Thr	Ser	Phe	Tyr	Ser	Asn	Gln	His	Thr
1				5					10					15	
Cys	Ser	Pro	Thr	Cys	Ser	Cys	Met	Tyr	Trp	Pro	Ile	Leu	Ser	Asp	Leu
			20					25					30		
Ile	Ser	Thr	Phe	Tyr	Gly	Ile	Ile	Ser	Asp	Cys	Asp	Glu	Val	Phe	Asn
		35					40					45			
Tyr	Trp	Glu	Pro	Leu	Asn	Phe	Met	Leu	Arg	Gly	Phe	Gly	Lys	Gln	Thr
	50					55					60				
Trp	Glu	Tyr	Ser	Pro	Glu	Tyr	Ala	Ile	Arg	Ser	Trp	Ser	Tyr	Leu	Val
65					70				75					80	
Pro	Leu	Trp	Ile	Ala	Gly	Tyr	Pro	Pro	Leu	Phe	Leu	Asp	Ile	Pro	Ser
				85					90					95	
Tyr	Tyr	Phe	Phe	Tyr	Phe	Phe	Arg	Leu	Leu	Leu	Val	Ile	Phe	Ser	Leu
			100					105					110		
Val	Ala	Glu	Val	Lys	Leu	Tyr	His	Ser	Leu	Lys	Lys	Asn	Val	Ser	Ser
		115					120					125			
Lys	Ile	Ser	Phe	Trp	Tyr	Leu	Leu	Phe	Thr	Thr	Val	Ala	Pro	Gly	Met
	130					135					140				
Ser	His	Ser	Thr	Ile	Ala	Leu	Leu	Pro	Ser	Ser	Phe	Ala	Met	Val	Cys
145				150					155					160	
His	Thr	Phe	Ala	Ile	Arg	Tyr	Val	Ile	Asp	Tyr	Leu	Gln	Leu	Pro	Thr
			165					170					175		
Leu	Met	Arg	Thr	Ile	Arg	Glu	Thr	Ala	Ala	Ile	Ser	Pro	Ala	His	Lys
		180						185					190		
Gln	Gln	Leu	Ala	Asn	Ser	Leu									
		195													

<210> 54  
 <211> 140  
 <212> PRT  
 <213> *Pichia pastoris*

<220>  
 <221> MOD\_RES  
 <222> (65)...(71)  
 <223> Xaa is a variable amino acid

<400> 54  
 Ile Ser Thr Phe Tyr Gly Ile Ile Ser Asp Cys Asp Glu Val Phe Asn  
 1 5 10 15  
 Tyr Trp Glu Pro Leu Asn Phe Met Leu Arg Gly Phe Gly Lys Gln Thr  
 20 25 30  
 Trp Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Ser Tyr Leu Val  
 35 40 45  
 Pro Leu Trp Ile Ala Gly Tyr Pro Pro Leu Phe Leu Asp Ile Pro Ser  
 50 55 60  
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Arg Leu Leu Leu Val Ile Phe Ser Leu  
 65 70 75 80  
 Val Ala Glu Val Lys Leu Tyr His Ser Leu Lys Lys Asn Val Ser Ser  
 85 90 95  
 Lys Ile Ser Phe Trp Tyr Leu Leu Phe Thr Thr Val Ala Pro Gly Met  
 100 105 110  
 Ser His Ser Thr Ile Ala Leu Leu Pro Ser Ser Phe Ala Met Val Cys  
 115 120 125  
 His Thr Phe Ala Ile Arg Tyr Val Ile Asp Tyr Leu  
 130 135 140

<210> 55  
 <211> 141  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*

&lt;400&gt; 55

```

Ile Gln Pro Thr Phe Ser Leu Ile Ser Asp Cys Asp Glu Thr Phe Asn
 1              5              10              15
Tyr Trp Glu Pro Leu Asn Leu Leu Val Arg Gly Phe Gly Lys Gln Thr
      20              25              30
Trp Glu Tyr Ser Pro Glu Tyr Ser Ile Arg Ser Trp Ala Phe Leu Leu
      35              40              45
Pro Phe Tyr Cys Ile Leu Tyr Pro Val Asn Lys Phe Thr Asp Leu Glu
      50              55              60
Ser His Trp Asn Phe Phe Ile Thr Arg Ala Cys Leu Gly Phe Phe Ser
65              70              75              80
Phe Ile Met Glu Phe Lys Leu His Arg Glu Ile Ala Gly Ser Leu Ala
      85              90              95
Leu Gln Ile Ala Asn Ile Trp Ile Ile Phe Gln Leu Phe Asn Pro Gly
      100             105             110
Trp Phe His Ala Ser Val Glu Leu Leu Pro Ser Ala Val Ala Met Leu
      115             120             125
Leu Tyr Val Gly Ala Thr Arg His Ser Leu Arg Tyr Leu
      130             135             140

```

&lt;210&gt; 56

&lt;211&gt; 127

&lt;212&gt; PRT

<213> *Pichia pastoris*

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (66)...(72)

&lt;223&gt; Xaa is a variable amino acid

&lt;400&gt; 56

```

Leu Ile Ser Thr Phe Tyr Gly Ile Ile Ser Asp Cys Asp Glu Val Phe
 1              5              10              15
Asn Tyr Trp Glu Pro Leu Asn Phe Met Leu Arg Gly Phe Gly Lys Gln
      20              25              30
Thr Trp Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Ser Tyr Leu

```



35	40	45
Val Pro Leu Trp Ile Ala Gly Tyr Pro Pro Leu Phe Leu Asp Ile Pro		
50	55	60
Ser Xaa Xaa Xaa Xaa Xaa Xaa Xaa Arg Leu Leu Leu Val Ile Phe Ser		
65	70	75
Leu Val Ala Glu Val Lys Leu Tyr His Ser Leu Lys Lys Asn Val Ser		
85	90	95
Ser Lys Ile Ser Phe Trp Tyr Leu Leu Phe Thr Thr Val Ala Pro Gly		
100	105	110
Met Ser His Ser Thr Ile Ala Leu Leu Pro Ser Ser Phe Ala Met		
115	120	125

&lt;210&gt; 57

&lt;211&gt; 127

&lt;212&gt; PRT

&lt;213&gt; Anopheles gambiae

&lt;400&gt; 57

Leu Gln Ser Ala Leu Tyr Ser Ile Ile Ser Asp Cys Asp Glu Thr Tyr		
1	5	10
Asn Tyr Trp Glu Pro Leu His Tyr Leu Leu Lys Gly Lys Gly Phe Gln		
20	25	30
Thr Trp Glu Tyr Ser Pro Glu Phe Ala Leu Arg Ser Tyr Ser Tyr Leu		
35	40	45
Trp Leu His Gly Leu Pro Ala Lys Val Leu Gln Leu Met Thr Asp Asn		
50	55	60
Gly Val Leu Ile Phe Tyr Phe Val Arg Cys Leu Leu Ala Val Thr Cys		
65	70	75
Ala Leu Leu Glu Tyr Arg Leu Tyr Arg Ile Leu Gly Arg Lys Cys Gly		
85	90	95
Gly Gly Val Ala Ser Leu Trp Leu Leu Phe Gln Leu Thr Ser Ala Gly		
100	105	110
Met Phe Ile Ser Ser Ala Ala Leu Leu Pro Ser Ser Phe Ser Met		
115	120	125

<210> 58

<211> 157

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD\_RES

<222> (66)...(72)

<223> Xaa is a variable amino acid

<400> 58

Leu	Ile	Ser	Thr	Phe	Tyr	Gly	Ile	Ile	Ser	Asp	Cys	Asp	Glu	Val	Phe
1				5					10					15	
Asn	Tyr	Trp	Glu	Pro	Leu	Asn	Phe	Met	Leu	Arg	Gly	Phe	Gly	Lys	Gln
			20					25					30		
Thr	Trp	Glu	Tyr	Ser	Pro	Glu	Tyr	Ala	Ile	Arg	Ser	Trp	Ser	Tyr	Leu
		35						40					45		
Val	Pro	Leu	Trp	Ile	Ala	Gly	Tyr	Pro	Pro	Leu	Phe	Leu	Asp	Ile	Pro
	50					55				60					
Ser	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Arg	Leu	Leu	Leu	Val	Ile	Phe	Ser
65				70					75					80	
Leu	Val	Ala	Glu	Val	Lys	Leu	Tyr	His	Ser	Leu	Lys	Lys	Asn	Val	Ser
				85					90					95	
Ser	Lys	Ile	Ser	Phe	Trp	Tyr	Leu	Leu	Phe	Thr	Thr	Val	Ala	Pro	Gly
		100						105					110		
Met	Ser	His	Ser	Thr	Ile	Ala	Leu	Leu	Pro	Ser	Ser	Phe	Ala	Met	Val
		115						120					125		
Cys	His	Thr	Phe	Ala	Ile	Arg	Tyr	Val	Ile	Asp	Tyr	Leu	Gln	Leu	Pro
	130					135						140			
Thr	Leu	Met	Arg	Thr	Ile	Arg	Glu	Thr	Ala	Ala	Ile	Ser			
145					150						155				

<210> 59

<211> 154

<212> PRT

<213> *Schizosaccharomyces pombe*

<400> 59

```

Leu Thr Ser Ala Ser Phe Arg Val Ile Asp Asp Cys Asp Glu Val Tyr
 1             5             10             15
Asn Tyr Trp Glu Pro Leu His Tyr Leu Leu Tyr Gly Tyr Gly Leu Gln
      20             25             30
Thr Trp Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Phe Tyr Ile
      35             40             45
Ala Leu His Ala Val Pro Gly Phe Leu Ala Arg Gly Leu Gly Leu Ser
 50             55             60
Arg Leu His Val Phe Tyr Phe Ile Arg Gly Val Leu Ala Cys Phe Ser
65             70             75             80
Ala Phe Cys Glu Thr Asn Leu Ile Leu Ala Val Ala Arg Asn Phe Asn
      85             90             95
Arg Ala Val Ala Leu His Leu Thr Ser Val Leu Phe Val Asn Ser Gly
      100            105            110
Met Trp Ser Ala Ser Thr Ser Phe Leu Pro Ser Ser Phe Ala Met Asn
      115            120            125
Met Val Thr Leu Ala Leu Ser Ala Gln Leu Ser Pro Pro Ser Thr Lys
      130            135            140
Arg Thr Val Lys Val Val Ser Phe Ile Thr
145            150

```

<210> 60

<211> 141

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD\_RES

<222> (80)...(86)

<223> Xaa is a variable amino acid

<400> 60

```

Ser Pro Thr Cys Ser Cys Met Tyr Trp Pro Ile Leu Ser Asp Leu Ile
 1             5             10             15

```

Ser Thr Phe Tyr Gly Ile Ile Ser Asp Cys Asp Glu Val Phe Asn Tyr  
                   20                                  25                                  30  
 Trp Glu Pro Leu Asn Phe Met Leu Arg Gly Phe Gly Lys Gln Thr Trp  
                   35                                  40                                  45  
 Glu Tyr Ser Pro Glu Tyr Ala Ile Arg Ser Trp Ser Tyr Leu Val Pro  
                   50                                  55                                  60  
 Leu Trp Ile Ala Gly Tyr Pro Pro Leu Phe Leu Asp Ile Pro Ser Xaa  
 65                                  70                                  75                                  80  
 Xaa Xaa Xaa Xaa Xaa Xaa Arg Leu Leu Leu Val Ile Phe Ser Leu Val  
                                   85                                  90                                  95  
 Ala Glu Val Lys Leu Tyr His Ser Leu Lys Lys Asn Val Ser Ser Lys  
                   100                                  105                                  110  
 Ile Ser Phe Trp Tyr Leu Leu Phe Thr Thr Val Ala Pro Gly Met Ser  
                   115                                  120                                  125  
 His Ser Thr Ile Ala Leu Leu Pro Ser Ser Phe Ala Met  
                   130                                  135                                  140

&lt;210&gt; 61

&lt;211&gt; 143

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 61

Ala Pro Glu Gly Ser Thr Ala Phe Lys Cys Leu Leu Ser Ala Arg Leu  
   1                                  5                                  10                                  15  
 Cys Ala Ala Leu Leu Ser Asn Ile Ser Asp Cys Asp Glu Thr Phe Asn  
                   20                                  25                                  30  
 Tyr Trp Glu Pro Thr His Tyr Leu Ile Tyr Gly Lys Gly Phe Gln Thr  
                   35                                  40                                  45  
 Trp Glu Tyr Ser Pro Val Tyr Ala Ile Arg Ser Tyr Ala Tyr Leu Leu  
                   50                                  55                                  60  
 Leu His Ala Trp Pro Ala Ala Phe His Ala Arg Ile Leu Gln Thr Asn  
 65                                  70                                  75                                  80  
 Lys Ile Leu Val Phe Tyr Phe Leu Arg Cys Leu Leu Ala Phe Val Ser  
                   85                                  90                                  95  
 Cys Val Cys Glu Leu Tyr Phe Tyr Lys Ala Val Cys Lys Lys Phe Gly

	100		105		110
Leu	His	Val	Ser	Arg	Met
		Met	Leu	Ala	Phe
			Leu	Val	Leu
			Ser	Thr	Gly
	115		120		125
Met	Phe	Cys	Ser	Ser	Ser
		Ala	Phe	Leu	Pro
			Ser	Ser	Phe
			Cys	Met	
	130		135		140

&lt;210&gt; 62

&lt;211&gt; 141

&lt;212&gt; PRT

<213> *Pichia pastoris*

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (80)...(86)

&lt;223&gt; Xaa is a variable amino acid

&lt;400&gt; 62

Ser	Pro	Thr	Cys	Ser	Cys	Met	Tyr	Trp	Pro	Ile	Leu	Ser	Asp	Leu	Ile
1				5					10					15	
Ser	Thr	Phe	Tyr	Gly	Ile	Ile	Ser	Asp	Cys	Asp	Glu	Val	Phe	Asn	Tyr
			20				25						30		
Trp	Glu	Pro	Leu	Asn	Phe	Met	Leu	Arg	Gly	Phe	Gly	Lys	Gln	Thr	Trp
		35					40					45			
Glu	Tyr	Ser	Pro	Glu	Tyr	Ala	Ile	Arg	Ser	Trp	Ser	Tyr	Leu	Val	Pro
	50					55					60				
Leu	Trp	Ile	Ala	Gly	Tyr	Pro	Pro	Leu	Phe	Leu	Asp	Ile	Pro	Ser	Xaa
65					70				75					80	
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Arg	Leu	Leu	Leu	Val	Ile	Phe	Ser	Leu	Val
			85					90					95		
Ala	Glu	Val	Lys	Leu	Tyr	His	Ser	Leu	Lys	Lys	Asn	Val	Ser	Ser	Lys
		100						105					110		
Ile	Ser	Phe	Trp	Tyr	Leu	Leu	Phe	Thr	Thr	Val	Ala	Pro	Gly	Met	Ser
		115						120					125		
His	Ser	Thr	Ile	Ala	Leu	Leu	Pro	Ser	Ser	Phe	Ala	Met			
		130						135					140		

<210> 63  
 <211> 143  
 <212> PRT  
 <213> Homo sapiens

<400> 63  
 Ala Pro Glu Gly Ser Thr Ala Phe Lys Cys Leu Leu Ser Ala Arg Leu  
 1 5 10 15  
 Cys Ala Ala Leu Leu Ser Asn Ile Ser Asp Cys Asp Glu Thr Phe Asn  
 20 25 30  
 Tyr Trp Glu Pro Thr His Tyr Leu Ile Tyr Gly Glu Gly Phe Gln Thr  
 35 40 45  
 Trp Glu Tyr Ser Pro Ala Tyr Ala Ile Arg Ser Tyr Ala Tyr Leu Leu  
 50 55 60  
 Leu His Ala Trp Pro Ala Ala Phe His Ala Arg Ile Leu Gln Thr Asn  
 65 70 75 80  
 Lys Ile Leu Val Phe Tyr Phe Leu Arg Cys Leu Leu Ala Phe Val Ser  
 85 90 95  
 Cys Ile Cys Glu Leu Tyr Phe Tyr Lys Ala Val Cys Lys Lys Phe Gly  
 100 105 110  
 Leu His Val Ser Arg Met Met Leu Ala Phe Leu Val Leu Ser Thr Gly  
 115 120 125  
 Met Phe Cys Ser Ser Ser Ala Phe Leu Pro Ser Ser Phe Cys Met  
 130 135 140

<210> 64  
 <211> 1656  
 <212> DNA  
 <213> Saccharomyces cerevisiae

<400> 64  
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 gctccattca ccaaggtgga agagagtttt aatattcaag ccattcatga tattttaacc 120  
 tacagcgtat ttgatatctc ccaatatgac cacttgaaat ttcttgaggat agtccctaga 180  
 acattcgcttg gtgctgtgat tattgcaatg ctttcgagac cttatcttta cttgagttct 240

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ttgatccaaa cttccaggcc tacgtctata gatgttcaat tggtcgtag ggggattggt 300
ggcctcacca atgggctttc ttttatctat ttaaagaatt gtttgcaaga tatgtttgat 360
gaaatcactg aaaagaaaaa ggaagaaaat gaagacaagg atatatacat ttacgatagc 420
gctggtacat ggtttctttt atttttaatt ggcagtttcc acctcatgtt ctacagcact 480
aggactctgc ctaattttgt catgactctg cctctaacca acgtcgcatt ggggtgggtt 540
ttattgggtc gttataatgc agctatattc ctatctgcgc tcgtggcaat tgtatttaga 600
ctggaagtgt cagctctcag tgctggtatt gctctattta gcgtcatctt caagaagatt 660
tctttattcg atgctatcaa attcgggtatc tttggcttgg gacttggttc cgccatcagt 720
atcacggttg attcatattt ctggcaagaa tgggtgtctac ctgaggtaga tggtttcttg 780
ttcaacgtgg ttgcgggtta cgcttccaag tggggtgtgg agccagttac tgcttatttc 840
acgcattact tgagaatgat gtttatgcc acaactgttt tactattgaa ttacttcggc 900
tataaattag cacctgcaaa attaaaaatt gtctcactag catctctttt ccacattatc 960
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accaatgttt tatgtttggc tatattgccc ttatctataa tgacctcctt tttcatttca 1140
atggcgttct tgtatatatc aagaatgaat tatccaggcg gcgaggcttt aacttctttt 1200
aatgacatga ttgtggaaaa aaatattaca aacgctacag ttcatatcag catacctcct 1260
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accacgagc caaccgcctc tcaattgcc a ttcgagaata agactaccaa ccattgggag 1440
ctagttaaca caacaaagat gtttactgga tttgaccaa cctacattaa gaactttggt 1500
ttccaagaga gagtgaatgt tttgtctcta ctcaaacaga tcattttcga caagaccct 1560
accgtttttt tgaaagaatt gacggccaat tcgattgtta aaagcgatgt cttcttcacc 1620
tataagagaa tcaaacaaga tgaaaaaact gattga 1656

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&lt;210&gt; 65

&lt;211&gt; 551

&lt;212&gt; PRT

<213> *Saccharomyces cerevisiae*

&lt;400&gt; 65

```

Met Arg Trp Ser Val Leu Asp Thr Val Leu Leu Thr Val Ile Ser Phe
 1             5             10             15
His Leu Ile Gln Ala Pro Phe Thr Lys Val Glu Glu Ser Phe Asn Ile
          20             25             30
Gln Ala Ile His Asp Ile Leu Thr Tyr Ser Val Phe Asp Ile Ser Gln
        35             40             45

```

Tyr Asp His Leu Lys Phe Pro Gly Val Val Pro Arg Thr Phe Val Gly  
 50 55 60  
 Ala Val Ile Ile Ala Met Leu Ser Arg Pro Tyr Leu Tyr Leu Ser Ser  
 65 70 75 80  
 Leu Ile Gln Thr Ser Arg Pro Thr Ser Ile Asp Val Gln Leu Val Val  
 85 90 95  
 Arg Gly Ile Val Gly Leu Thr Asn Gly Leu Ser Phe Ile Tyr Leu Lys  
 100 105 110  
 Asn Cys Leu Gln Asp Met Phe Asp Glu Ile Thr Glu Lys Lys Lys Glu  
 115 120 125  
 Glu Asn Glu Asp Lys Asp Ile Tyr Ile Tyr Asp Ser Ala Gly Thr Trp  
 130 135 140  
 Phe Leu Leu Phe Leu Ile Gly Ser Phe His Leu Met Phe Tyr Ser Thr  
 145 150 155 160  
 Arg Thr Leu Pro Asn Phe Val Met Thr Leu Pro Leu Thr Asn Val Ala  
 165 170 175  
 Leu Gly Trp Val Leu Leu Gly Arg Tyr Asn Ala Ala Ile Phe Leu Ser  
 180 185 190  
 Ala Leu Val Ala Ile Val Phe Arg Leu Glu Val Ser Ala Leu Ser Ala  
 195 200 205  
 Gly Ile Ala Leu Phe Ser Val Ile Phe Lys Lys Ile Ser Leu Phe Asp  
 210 215 220  
 Ala Ile Lys Phe Gly Ile Phe Gly Leu Gly Leu Gly Ser Ala Ile Ser  
 225 230 235 240  
 Ile Thr Val Asp Ser Tyr Phe Trp Gln Glu Trp Cys Leu Pro Glu Val  
 245 250 255  
 Asp Gly Phe Leu Phe Asn Val Val Ala Gly Tyr Ala Ser Lys Trp Gly  
 260 265 270  
 Val Glu Pro Val Thr Ala Tyr Phe Thr His Tyr Leu Arg Met Met Phe  
 275 280 285  
 Met Pro Pro Thr Val Leu Leu Leu Asn Tyr Phe Gly Tyr Lys Leu Ala  
 290 295 300  
 Pro Ala Lys Leu Lys Ile Val Ser Leu Ala Ser Leu Phe His Ile Ile  
 305 310 315 320  
 Val Leu Ser Phe Gln Pro His Lys Glu Trp Arg Phe Ile Ile Tyr Ala  
 325 330 335  
 Val Pro Ser Ile Met Leu Leu Gly Ala Thr Gly Ala Ala His Leu Trp



```

          340              345              350
Glu Asn Met Lys Val Lys Lys Ile Thr Asn Val Leu Cys Leu Ala Ile
          355              360              365
Leu Pro Leu Ser Ile Met Thr Ser Phe Phe Ile Ser Met Ala Phe Leu
          370              375              380
Tyr Ile Ser Arg Met Asn Tyr Pro Gly Gly Glu Ala Leu Thr Ser Phe
385              390              395              400
Asn Asp Met Ile Val Glu Lys Asn Ile Thr Asn Ala Thr Val His Ile
          405              410              415
Ser Ile Pro Pro Cys Met Thr Gly Val Thr Leu Phe Gly Glu Leu Asn
          420              425              430
Tyr Gly Val Tyr Gly Ile Asn Tyr Asp Lys Thr Glu Asn Thr Thr Leu
          435              440              445
Leu Gln Glu Met Trp Pro Ser Phe Asp Phe Leu Ile Thr His Glu Pro
          450              455              460
Thr Ala Ser Gln Leu Pro Phe Glu Asn Lys Thr Thr Asn His Trp Glu
465              470              475              480
Leu Val Asn Thr Thr Lys Met Phe Thr Gly Phe Asp Pro Thr Tyr Ile
          485              490              495
Lys Asn Phe Val Phe Gln Glu Arg Val Asn Val Leu Ser Leu Leu Lys
          500              505              510
Gln Ile Ile Phe Asp Lys Thr Pro Thr Val Phe Leu Lys Glu Leu Thr
          515              520              525
Ala Asn Ser Ile Val Lys Ser Asp Val Phe Phe Thr Tyr Lys Arg Ile
          530              535              540
Lys Gln Asp Glu Lys Thr Asp
545              550

```

&lt;210&gt; 66

&lt;211&gt; 840

&lt;212&gt; DNA

<213> *Pichia pastoris*

&lt;400&gt; 66

```

tcggtcgaga atgataactg aagaactcaa aatctctcac actttcatcg ttactgtact 60
ggcaatcatt gcatttcagc ctcataaaga atggagattt atagttttaca ttgttccacc 120

```

acttgctcacc accatatcta cagtacttgc acaactaccc aggagattca caatcgtcaa 180  
 agttgctggtt tttctcctaa gtttcggctc tttgctcata tccctgtcgt ttcttttcat 240  
 ctcatcgtat aactaccctg ggggtgaagc ttacagcat ttgaacgaga aactccttct 300  
 actggaccaa agttccctac ctgttgatat taaggttcat atggatgtcc ctgcatgcat 360  
 gactgggggtg actttatttg gttacttgga taactcaaaa ttgaacaatt taagaattgt 420  
 ctatgataaa acagaagacg agtcgctgga cacaatctgg gattctttca attatgtcat 480  
 ctccgaaatt gacttggtt ctctgactgc tcccaaattg gagggggatt ggctgaagat 540  
 tgatgttgct caaggctaca acggcatcaa taaacaatct atcaaaaata caattttcaa 600  
 ttatggaata cttaaacgga tgataagaga cgcaaccaa cttgatgttg gatttattcg 660  
 tacggtcttt cgatccttca taaaatttga tgataaatta ttcatttatg agaggagcag 720  
 tcaaacctga aaatatatac ctcatgtgtt caatttggtg taaagagtgt ggcggataga 780  
 cttcttgtaa atcaggaaag ctacaattcc aattgctgca aaaaatacca atgcccataa 840

<210> 67

<211> 239

<212> PRT

<213> *Pichia pastoris*

<400> 67

Arg	Met	Ile	Thr	Glu	Glu	Leu	Lys	Ile	Ser	His	Thr	Phe	Ile	Val	Thr
1				5				10					15		
Val	Leu	Ala	Ile	Ile	Ala	Phe	Gln	Pro	His	Lys	Glu	Trp	Arg	Phe	Ile
			20					25					30		
Val	Tyr	Ile	Val	Pro	Pro	Leu	Val	Ile	Thr	Ile	Ser	Thr	Val	Leu	Ala
			35					40					45		
Gln	Leu	Pro	Arg	Arg	Phe	Thr	Ile	Val	Lys	Val	Ala	Val	Phe	Leu	Leu
			50					55					60		
Ser	Phe	Gly	Ser	Leu	Leu	Ile	Ser	Leu	Ser	Phe	Leu	Phe	Ile	Ser	Ser
65				70					75					80	
Tyr	Asn	Tyr	Pro	Gly	Gly	Glu	Ala	Leu	Gln	His	Leu	Asn	Glu	Lys	Leu
				85					90					95	
Leu	Leu	Leu	Asp	Gln	Ser	Ser	Leu	Pro	Val	Asp	Ile	Lys	Val	His	Met
			100					105					110		
Asp	Val	Pro	Ala	Cys	Met	Thr	Gly	Val	Thr	Leu	Phe	Gly	Tyr	Leu	Asp
			115					120					125		
Asn	Ser	Lys	Leu	Asn	Asn	Leu	Arg	Ile	Val	Tyr	Asp	Lys	Thr	Glu	Asp

```

      130              135              140
Glu Ser Leu Asp Thr Ile Trp Asp Ser Phe Asn Tyr Val Ile Ser Glu
145              150              155              160
Ile Asp Leu Asp Ser Ser Thr Ala Pro Lys Trp Glu Gly Asp Trp Leu
      165              170              175
Lys Ile Asp Val Val Gln Gly Tyr Asn Gly Ile Asn Lys Gln Ser Ile
      180              185              190
Lys Asn Thr Ile Phe Asn Tyr Gly Ile Leu Lys Arg Met Ile Arg Asp
      195              200              205
Ala Thr Lys Leu Asp Val Gly Phe Ile Arg Thr Val Phe Arg Ser Phe
      210              215              220
Ile Lys Phe Asp Asp Lys Leu Phe Ile Tyr Glu Arg Ser Ser Gln
225              230              235

```

<210> 68

<211> 239

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD\_RES

<222> (62)...(80)

<223> Xaa is a variable amino acid

<400> 68

```

Arg Met Ile Thr Glu Glu Leu Lys Ile Ser His Thr Phe Ile Val Thr
  1              5              10              15
Val Leu Ala Ile Ile Ala Phe Gln Pro His Lys Glu Trp Arg Phe Ile
      20              25              30
Val Tyr Ile Val Pro Pro Leu Val Ile Thr Ile Ser Thr Val Leu Ala
      35              40              45
Gln Leu Pro Arg Arg Phe Thr Ile Val Lys Val Ala Val Xaa Xaa Xaa
      50              55              60
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      65              70              75              80
Tyr Asn Tyr Pro Gly Gly Glu Ala Leu Gln His Leu Asn Glu Lys Leu

```

	85		90		95										
Leu	Leu	Leu	Asp	Gln	Ser	Ser	Leu	Pro	Val	Asp	Ile	Lys	Val	His	Met
	100						105						110		
Asp	Val	Pro	Ala	Cys	Met	Thr	Gly	Val	Thr	Leu	Phe	Gly	Tyr	Leu	Asp
	115						120						125		
Asn	Ser	Lys	Leu	Asn	Asn	Leu	Arg	Ile	Val	Tyr	Asp	Lys	Thr	Glu	Asp
	130						135						140		
Glu	Ser	Leu	Asp	Thr	Ile	Trp	Asp	Ser	Phe	Asn	Tyr	Val	Ile	Ser	Glu
145					150					155				160	
Ile	Asp	Leu	Asp	Ser	Ser	Thr	Ala	Pro	Lys	Trp	Glu	Gly	Asp	Trp	Leu
			165						170					175	
Lys	Ile	Asp	Val	Val	Gln	Gly	Tyr	Asn	Gly	Ile	Asn	Lys	Gln	Ser	Ile
	180							185					190		
Lys	Asn	Thr	Ile	Phe	Asn	Tyr	Gly	Ile	Leu	Lys	Arg	Met	Ile	Arg	Asp
	195							200					205		
Ala	Thr	Lys	Leu	Asp	Val	Gly	Phe	Ile	Arg	Thr	Val	Phe	Arg	Ser	Phe
	210						215					220			
Ile	Lys	Phe	Asp	Asp	Lys	Leu	Phe	Ile	Tyr	Glu	Arg	Ser	Ser	Gln	
225				230						235					

&lt;210&gt; 69

&lt;211&gt; 245

&lt;212&gt; PRT

<213> *Saccharomyces cerevisiae*

&lt;400&gt; 69

Lys	Leu	Ala	Pro	Ala	Lys	Leu	Lys	Ile	Val	Ser	Leu	Ala	Ser	Leu	Phe
1				5					10					15	
His	Ile	Ile	Val	Leu	Ser	Phe	Gln	Pro	His	Lys	Glu	Trp	Arg	Phe	Ile
			20					25					30		
Ile	Tyr	Ala	Val	Pro	Ser	Ile	Met	Leu	Leu	Gly	Ala	Thr	Gly	Ala	Ala
	35						40					45			
His	Leu	Trp	Glu	Asn	Met	Lys	Val	Lys	Lys	Ile	Thr	Asn	Val	Leu	Cys
	50					55				60					
Leu	Ala	Ile	Leu	Pro	Leu	Ser	Ile	Met	Thr	Ser	Phe	Phe	Ile	Ser	Met
65					70					75				80	

Ala Phe Leu Tyr Ile Ser Arg Met Asn Tyr Pro Gly Gly Glu Ala Leu  
                     85                    90                    95  
 Thr Ser Phe Asn Asp Met Ile Val Glu Lys Asn Ile Thr Asn Ala Thr  
                     100                    105                    110  
 Val His Ile Ser Ile Pro Pro Cys Met Thr Gly Val Thr Leu Phe Gly  
                     115                    120                    125  
 Glu Leu Asn Tyr Gly Val Tyr Gly Ile Asn Tyr Asp Lys Thr Glu Asn  
                     130                    135                    140  
 Thr Thr Leu Leu Gln Glu Met Trp Pro Ser Phe Asp Phe Leu Ile Thr  
 145                    150                    155                    160  
 His Glu Pro Thr Ala Ser Gln Leu Pro Phe Glu Asn Lys Thr Thr Asn  
                     165                    170                    175  
 His Trp Glu Leu Val Asn Thr Thr Lys Met Phe Thr Gly Phe Asp Pro  
                     180                    185                    190  
 Thr Tyr Ile Lys Asn Phe Val Phe Gln Glu Arg Val Asn Val Leu Ser  
                     195                    200                    205  
 Leu Leu Lys Gln Ile Ile Phe Asp Lys Thr Pro Thr Val Phe Leu Lys  
                     210                    215                    220  
 Glu Leu Thr Ala Asn Ser Ile Val Lys Ser Asp Val Phe Phe Thr Tyr  
 225                    230                    235                    240  
 Lys Arg Ile Lys Gln  
                     245

&lt;210&gt; 70

&lt;211&gt; 141

&lt;212&gt; PRT

<213> *Pichia pastoris*

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (43)...(61)

&lt;223&gt; Xaa is a variable amino acid

&lt;400&gt; 70

Ile Ile Ala Phe Gln Pro His Lys Glu Trp Arg Phe Ile Val Tyr Ile  
 1                    5                    10                    15

```

Val Pro Pro Leu Val Ile Thr Ile Ser Thr Val Leu Ala Gln Leu Pro
      20                      25                      30
Arg Arg Phe Thr Ile Val Lys Val Ala Val Xaa Xaa Xaa Xaa Xaa Xaa
      35                      40                      45
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Asn Tyr
      50                      55                      60
Pro Gly Gly Glu Ala Leu Gln His Leu Asn Glu Lys Leu Leu Leu Leu
      65                      70                      75                      80
Asp Gln Ser Ser Leu Pro Val Asp Ile Lys Val His Met Asp Val Pro
      85                      90                      95
Ala Cys Met Thr Gly Val Thr Leu Phe Gly Tyr Leu Asp Asn Ser Lys
      100                     105                     110
Leu Asn Asn Leu Arg Ile Val Tyr Asp Lys Thr Glu Asp Glu Ser Leu
      115                     120                     125
Asp Thr Ile Trp Asp Ser Phe Asn Tyr Val Ile Ser Glu
      130                     135                     140

```

&lt;210&gt; 71

&lt;211&gt; 137

&lt;212&gt; PRT

&lt;213&gt; Schizosaccharomyces pombe

&lt;400&gt; 71

```

Val Tyr Ser Phe Leu Gly His Lys Glu Trp Arg Phe Ile Ile Tyr Ser
  1                      5                      10                      15
Ile Pro Trp Phe Asn Ala Ala Ser Ala Ile Gly Ala Ser Leu Cys Phe
      20                      25                      30
Asn Ala Ser Lys Phe Gly Lys Lys Ile Phe Glu Ile Leu Arg Leu Met
      35                      40                      45
Phe Phe Ser Gly Ile Ile Phe Gly Phe Ile Gly Ser Ser Phe Leu Leu
      50                      55                      60
Tyr Val Phe Gln Tyr Ala Tyr Pro Gly Gly Leu Ala Leu Thr Arg Leu
      65                      70                      75                      80
Tyr Glu Ile Glu Asn His Pro Gln Val Ser Val His Met Asp Val Tyr
      85                      90                      95
Pro Cys Met Thr Gly Ile Thr Arg Phe Ser Gln Leu Pro Ser Trp Tyr

```

```

          100              105              110
Tyr Asp Lys Thr Glu Asp Pro Lys Met Leu Ser Asn Ser Leu Phe Ile
          115              120              125
Ser Gln Phe Asp Tyr Leu Ile Thr Glu
          130              135

```

```

<210> 72
<211> 143
<212> PRT
<213> Pichia pastoris

```

```

<220>
<221> MOD_RES
<222> (45)...(63)
<223> Xaa is a variable amino acid

```

```

<400> 72
Leu Ala Ile Ile Ala Phe Gln Pro His Lys Glu Trp Arg Phe Ile Val
  1              5              10              15
Tyr Ile Val Pro Pro Leu Val Ile Thr Ile Ser Thr Val Leu Ala Gln
          20              25              30
Leu Pro Arg Arg Phe Thr Ile Val Lys Val Ala Val Xaa Xaa Xaa Xaa
          35              40              45
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr
          50              55              60
Asn Tyr Pro Gly Gly Glu Ala Leu Gln His Leu Asn Glu Lys Leu Leu
  65              70              75              80
Leu Leu Asp Gln Ser Ser Leu Pro Val Asp Ile Lys Val His Met Asp
          85              90              95
Val Pro Ala Cys Met Thr Gly Val Thr Leu Phe Gly Tyr Leu Asp Asn
          100             105             110
Ser Lys Leu Asn Asn Leu Arg Ile Val Tyr Asp Lys Thr Glu Asp Glu
          115             120             125
Ser Leu Asp Thr Ile Trp Asp Ser Phe Asn Tyr Val Ile Ser Glu
          130             135             140

```

&lt;210&gt; 73

&lt;211&gt; 137

&lt;212&gt; PRT

&lt;213&gt; Homo sapiens

&lt;400&gt; 73

```

Met Ala Leu Tyr Ser Leu Leu Pro His Lys Glu Leu Arg Phe Ile Ile
  1              5              10              15
Tyr Ala Phe Pro Met Leu Asn Ile Thr Ala Ala Arg Gly Cys Ser Tyr
      20              25              30
Leu Leu Asn Asn Tyr Lys Lys Ser Trp Leu Tyr Lys Ala Gly Ser Leu
      35              40              45
Leu Val Ile Gly His Leu Val Val Asn Ala Ala Tyr Ser Ala Thr Ala
      50              55              60
Leu Tyr Val Ser His Phe Asn Tyr Pro Gly Gly Val Ala Met Gln Arg
      65              70              75              80
Leu His Gln Leu Val Pro Pro Gln Thr Asp Val Leu Leu His Ile Asp
      85              90              95
Val Ala Ala Ala Gln Thr Gly Val Ser Arg Phe Leu Gln Val Asn Ser
      100              105              110
Ala Trp Arg Tyr Asp Lys Arg Glu Asp Val Gln Pro Gly Thr Gly Met
      115              120              125
Leu Ala Tyr Thr His Ile Leu Met Glu
      130              135

```

&lt;210&gt; 74

&lt;211&gt; 1635

&lt;212&gt; DNA

&lt;213&gt; Saccharomyces cerevisiae

&lt;400&gt; 74

```

atggccattg gcaaaagggtt actggtgaac aaaccagcag aagaatcatt ttatgcttct 60
ccaatgtatg attttttgta tccgtttagg ccagtgggga accaatggct gccagaatat 120
attatctttg tatgtgctgt aatactgagg tgcacaattg gacttggtcc atattctggg 180
aaaggcagtc caccgctgta cggcgatttt gaggctcaga gacattggat ggaaattacg 240

```



```

caacattttac cgcttttctaa gtggtactgg tatgatttgc aatactgggg attggactat 300
ccaccattaa cagcattttca ttcgtacctt ctgggcctaa ttggatcttt tttcaatcca 360
tcttggtttg cactagaaaa gtcacgtggc tttgaatccc ccgataatgg cctgaaaaca 420
tatatgcgtt ctactgtcat cattagcgac atattgtttt actttcctgc agtaatatata 480
tttactaagt ggcttggttag atatcgaaac cagtcgcca taggacaatc tattgcggca 540
tcagcgattt tgttccaacc ttcattaatg ctcatgacc atgggcactt tcaatataat 600
tcagtcatgc ttggccttac tgcttatgcc ataaataact tattagatga gtattatgct 660
atggcgggcg tttgttttgt cctatccatt tgttttaaac aaatggcatt gtattatgca 720
ccgatttttt ttgcttatct attaagtcga tcattgctgt tccccaaatt taacatagct 780
agattgacgg ttattgcgtt tgcaacactc gcaacttttg ctataatatt tgcgccatta 840
tatttcttgg gaggaggatt aaagaatatt caccaatgta ttcacaggat attccctttt 900
gccaggggca tcttcgaaga caaggttgct aacttctggg gcgttacgaa cgtgtttgta 960
aaatacaagg aaagattcac tatacaacia ctccagctat attcattgat tgccaccgtg 1020
attggtttct taccagccat gataatgaca ttacttcata ccaaaaagca tcttctccca 1080
tacgtgttaa tcgcatgttc gatgtccttt tttcttttta gctttcaagt acatgagaaa 1140
actatcctca tcccactttt gcctattaca ctactctact cctctactga ttggaatgtt 1200
ctatctcttg taagttggat aaacaatgtg gctttgttta cgctatggcc tttgttgaaa 1260
aaggacggtc ttcatttaca gtatgccgta tctttcttac taagcaattg gctgattgga 1320
aatttcagtt ttattacacc aaggttcttg ccaaaatctt taactcctgg cccttctatc 1380
agcagcatca atagcgacta tagaagaaga agcttactgc catataatgt ggtttggaia 1440
agttttatca taggaacgta tattgctatg ggcttttata atttcttaga tcaatttgta 1500
gcacctccat cgaaatatcc agacttgtgg gtgttggtga actgtgctgt tgggttcatt 1560
tgcttttagca tattttggct atggtcttat tacaagatat tcacttccgg tagcaaatcc 1620
atgaaggact tgtag                                     1635

```

<210> 75

<211> 544

<212> PRT

<213> *Saccharomyces cerevisiae*

<400> 75

```

Met Ala Ile Gly Lys Arg Leu Leu Val Asn Lys Pro Ala Glu Glu Ser
 1             5             10             15
Phe Tyr Ala Ser Pro Met Tyr Asp Phe Leu Tyr Pro Phe Arg Pro Val
          20             25             30
Gly Asn Gln Trp Leu Pro Glu Tyr Ile Ile Phe Val Cys Ala Val Ile
          35             40             45

```

```

Leu Arg Cys Thr Ile Gly Leu Gly Pro Tyr Ser Gly Lys Gly Ser Pro
  50                      55                      60
Pro Leu Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Ile Thr
  65                      70                      75                      80
Gln His Leu Pro Leu Ser Lys Trp Tyr Trp Tyr Asp Leu Gln Tyr Trp
                      85                      90                      95
Gly Leu Asp Tyr Pro Pro Leu Thr Ala Phe His Ser Tyr Leu Leu Gly
                      100                      105                      110
Leu Ile Gly Ser Phe Phe Asn Pro Ser Trp Phe Ala Leu Glu Lys Ser
                      115                      120                      125
Arg Gly Phe Glu Ser Pro Asp Asn Gly Leu Lys Thr Tyr Met Arg Ser
                      130                      135                      140
Thr Val Ile Ile Ser Asp Ile Leu Phe Tyr Phe Pro Ala Val Ile Tyr
  145                      150                      155                      160
Phe Thr Lys Trp Leu Gly Arg Tyr Arg Asn Gln Ser Pro Ile Gly Gln
                      165                      170                      175
Ser Ile Ala Ala Ser Ala Ile Leu Phe Gln Pro Ser Leu Met Leu Ile
                      180                      185                      190
Asp His Gly His Phe Gln Tyr Asn Ser Val Met Leu Gly Leu Thr Ala
                      195                      200                      205
Tyr Ala Ile Asn Asn Leu Leu Asp Glu Tyr Tyr Ala Met Ala Ala Val
                      210                      215                      220
Cys Phe Val Leu Ser Ile Cys Phe Lys Gln Met Ala Leu Tyr Tyr Ala
  225                      230                      235                      240
Pro Ile Phe Phe Ala Tyr Leu Leu Ser Arg Ser Leu Leu Phe Pro Lys
                      245                      250                      255
Phe Asn Ile Ala Arg Leu Thr Val Ile Ala Phe Ala Thr Leu Ala Thr
                      260                      265                      270
Phe Ala Ile Ile Phe Ala Pro Leu Tyr Phe Leu Gly Gly Gly Leu Lys
                      275                      280                      285
Asn Ile His Gln Cys Ile His Arg Ile Phe Pro Phe Ala Arg Gly Ile
                      290                      295                      300
Phe Glu Asp Lys Val Ala Asn Phe Trp Cys Val Thr Asn Val Phe Val
  305                      310                      315                      320
Lys Tyr Lys Glu Arg Phe Thr Ile Gln Gln Leu Gln Leu Tyr Ser Leu
                      325                      330                      335
Ile Ala Thr Val Ile Gly Phe Leu Pro Ala Met Ile Met Thr Leu Leu

```

340	345	350
His Pro Lys Lys His Leu Leu Pro Tyr Val Leu Ile Ala Cys Ser Met		
355	360	365
Ser Phe Phe Leu Phe Ser Phe Gln Val His Glu Lys Thr Ile Leu Ile		
370	375	380
Pro Leu Leu Pro Ile Thr Leu Leu Tyr Ser Ser Thr Asp Trp Asn Val		
385	390	395
Leu Ser Leu Val Ser Trp Ile Asn Asn Val Ala Leu Phe Thr Leu Trp		
405	410	415
Pro Leu Leu Lys Lys Asp Gly Leu His Leu Gln Tyr Ala Val Ser Phe		
420	425	430
Leu Leu Ser Asn Trp Leu Ile Gly Asn Phe Ser Phe Ile Thr Pro Arg		
435	440	445
Phe Leu Pro Lys Ser Leu Thr Pro Gly Pro Ser Ile Ser Ser Ile Asn		
450	455	460
Ser Asp Tyr Arg Arg Arg Ser Leu Leu Pro Tyr Asn Val Val Trp Lys		
465	470	475
Ser Phe Ile Ile Gly Thr Tyr Ile Ala Met Gly Phe Tyr His Phe Leu		
485	490	495
Asp Gln Phe Val Ala Pro Pro Ser Lys Tyr Pro Asp Leu Trp Val Leu		
500	505	510
Leu Asn Cys Ala Val Gly Phe Ile Cys Phe Ser Ile Phe Trp Leu Trp		
515	520	525
Ser Tyr Tyr Lys Ile Phe Thr Ser Gly Ser Lys Ser Met Lys Asp Leu		
530	535	540

&lt;210&gt; 76

&lt;211&gt; 1644

&lt;212&gt; DNA

<213> *Pichia pastoris*

&lt;400&gt; 76

```

atgccacata aaagaacgcc ctctagcagt ctgctgtatg caagaattcc agggatctct 60
tttgaaaact ctccggtggt tgattttttg tctccttttg gaccgcgtcc taatcaatgg 120
gtagcacgat acatcatcat catctttgca attctcatca gattggcagt tgggctgggc 180
tcctattccg gcttcaacac ccctccaatg tatggggatt ttgaagctca gaggcattgg 240

```

```

atggaaatta ctcagcattt atccatagaa aaatgggtact tctacgactt gcaatattgg 300
gggcttgact atcctccctt gacagccttt cattcatact tctttggcaa attaggcagc 360
ttcatcaatc cagcatgggt tgctttagac gtctccagag gggttgaatc agtggatcta 420
aaatcgtaga tgagggcgac cgcaattctc agtgagctgt tatgttttat tccagctgtc 480
at ttgggtatt gtcgttggtat gggacttaac tacttcaatc aaaacgccat tgagcaaact 540
ataatagcgt ctgctattct tttcaatcca tctttaatta tcatagatca tggccacttc 600
cagtacaact cagttatgct aggttttgct ttattatcca tattaaatct gttgtacgat 660
aattttgcat tagcggtat ttttttcgtt ctttcaataa gctttaagca aatggctctc 720
tattatagcc ccatcatggt tttttacatg ctgagtgtga gttgttggcc tttgaaaaac 780
ttcaacttgt tgagattggc tactatcagt attgcagtac tcttgacttt tgcaactcta 840
ttactgcctt ttgtattagt agatgggatg tcacaaattg gccaaatatt attcagagtt 900
ttcccgtttt caagaggctt gtttgaggat aagggtggcca acttttggtg tacaacgaat 960
atactggtaa agtacaaaca gttattcact gacaaaaccc ttactaggat atcgctagta 1020
gcaactttga ttgcaattag tccgtcttgc ttcatcattt ttactcacc aaagaagggt 1080
ttactaccgt gggcttttgc tgcttgctct tgggcgttct atcttttctc tttccaagtc 1140
cacgagaaat cagttttagt tccattgatg cctaccactc tattactggt agaaaaagac 1200
ttggacatca tctcaatggt ctgctggatt tctaattatt ccttcttcag catgtggcct 1260
ctattaaaaa gagacgggct ggctttggaa tattttgtct tgggaatatt gagtaattgg 1320
ctgattggaa acctcaattg gattagtaaa tggcttgtcc ccagtttcct gattccagg 1380
cctactctct ccaaaaaagt tcctaaaaga gatactaaaa cagttgttca tactacttg 1440
ttttgggggt cagtaacatt cgtttcatac ctcgagcta cagttatcca gttcgtagat 1500
tggctgtacc ttccacctgc caagtatcca gatttgtggg ttattttgaa cactacattg 1560
tcgtttgctt gtttcgggtt gttttggcta tggattaact acaatctgta cattttgcgt 1620
gattttaagc ttaaagatgc ttag 1644

```

<210> 77

<211> 547

<212> PRT

<213> *Pichia pastoris*

<400> 77

```

Met Pro His Lys Arg Thr Pro Ser Ser Ser Leu Leu Tyr Ala Arg Ile
  1             5             10             15
Pro Gly Ile Ser Phe Glu Asn Ser Pro Val Phe Asp Phe Leu Ser Pro
          20             25             30
Phe Gly Pro Ala Pro Asn Gln Trp Val Ala Arg Tyr Ile Ile Ile Ile
        35             40             45

```

Phe	Ala	Ile	Leu	Ile	Arg	Leu	Ala	Val	Gly	Leu	Gly	Ser	Tyr	Ser	Gly
50						55					60				
Phe	Asn	Thr	Pro	Pro	Met	Tyr	Gly	Asp	Phe	Glu	Ala	Gln	Arg	His	Trp
65					70				75					80	
Met	Glu	Ile	Thr	Gln	His	Leu	Ser	Ile	Glu	Lys	Trp	Tyr	Phe	Tyr	Asp
				85					90					95	
Leu	Gln	Tyr	Trp	Gly	Leu	Asp	Tyr	Pro	Pro	Leu	Thr	Ala	Phe	His	Ser
				100				105						110	
Tyr	Phe	Phe	Gly	Lys	Leu	Gly	Ser	Phe	Ile	Asn	Pro	Ala	Trp	Phe	Ala
				115				120						125	
Leu	Asp	Val	Ser	Arg	Gly	Phe	Glu	Ser	Val	Asp	Leu	Lys	Ser	Tyr	Met
				130				135						140	
Arg	Ala	Thr	Ala	Ile	Leu	Ser	Glu	Leu	Leu	Cys	Phe	Ile	Pro	Ala	Val
145					150					155					160
Ile	Trp	Tyr	Cys	Arg	Trp	Met	Gly	Leu	Asn	Tyr	Phe	Asn	Gln	Asn	Ala
				165					170					175	
Ile	Glu	Gln	Thr	Ile	Ile	Ala	Ser	Ala	Ile	Leu	Phe	Asn	Pro	Ser	Leu
				180					185					190	
Ile	Ile	Ile	Asp	His	Gly	His	Phe	Gln	Tyr	Asn	Ser	Val	Met	Leu	Gly
				195					200					205	
Phe	Ala	Leu	Leu	Ser	Ile	Leu	Asn	Leu	Leu	Tyr	Asp	Asn	Phe	Ala	Leu
				210				215						220	
Ala	Ala	Ile	Phe	Phe	Val	Leu	Ser	Ile	Ser	Phe	Lys	Gln	Met	Ala	Leu
225					230					235					240
Tyr	Tyr	Ser	Pro	Ile	Met	Phe	Phe	Tyr	Met	Leu	Ser	Val	Ser	Cys	Trp
				245					250					255	
Pro	Leu	Lys	Asn	Phe	Asn	Leu	Leu	Arg	Leu	Ala	Thr	Ile	Ser	Ile	Ala
				260				265						270	
Val	Leu	Leu	Thr	Phe	Ala	Thr	Leu	Leu	Leu	Pro	Phe	Val	Leu	Val	Asp
				275				280						285	
Gly	Met	Ser	Gln	Ile	Gly	Gln	Ile	Leu	Phe	Arg	Val	Phe	Pro	Phe	Ser
				290				295						300	
Arg	Gly	Leu	Phe	Glu	Asp	Lys	Val	Ala	Asn	Phe	Trp	Cys	Thr	Thr	Asn
305					310					315					320
Ile	Leu	Val	Lys	Tyr	Lys	Gln	Leu	Phe	Thr	Asp	Lys	Thr	Leu	Thr	Arg
				325					330					335	
Ile	Ser	Leu	Val	Ala	Thr	Leu	Ile	Ala	Ile	Ser	Pro	Ser	Cys	Phe	Ile

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          340              345              350
Ile Phe Thr His Pro Lys Lys Val Leu Leu Pro Trp Ala Phe Ala Ala
          355              360              365
Cys Ser Trp Ala Phe Tyr Leu Phe Ser Phe Gln Val His Glu Lys Ser
          370              375              380
Val Leu Val Pro Leu Met Pro Thr Thr Leu Leu Leu Val Glu Lys Asp
385              390              395              400
Leu Asp Ile Ile Ser Met Val Cys Trp Ile Ser Asn Ile Ala Phe Phe
          405              410              415
Ser Met Trp Pro Leu Leu Lys Arg Asp Gly Leu Ala Leu Glu Tyr Phe
          420              425              430
Val Leu Gly Ile Leu Ser Asn Trp Leu Ile Gly Asn Leu Asn Trp Ile
          435              440              445
Ser Lys Trp Leu Val Pro Ser Phe Leu Ile Pro Gly Pro Thr Leu Ser
          450              455              460
Lys Lys Val Pro Lys Arg Asp Thr Lys Thr Val Val His Thr His Trp
465              470              475              480
Phe Trp Gly Ser Val Thr Phe Val Ser Tyr Leu Gly Ala Thr Val Ile
          485              490              495
Gln Phe Val Asp Trp Leu Tyr Leu Pro Pro Ala Lys Tyr Pro Asp Leu
          500              505              510
Trp Val Ile Leu Asn Thr Thr Leu Ser Phe Ala Cys Phe Gly Leu Phe
          515              520              525
Trp Leu Trp Ile Asn Tyr Asn Leu Tyr Ile Leu Arg Asp Phe Lys Leu
          530              535              540
Lys Asp Ala
545

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&lt;210&gt; 78

&lt;211&gt; 527

&lt;212&gt; PRT

&lt;213&gt; Pichia pastoris

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (23) ... (37)

<223> Xaa is a variable amino acid

<220>

<221> MOD\_RES

<222> (366)...(378)

<223> Xaa is a variable amino acid

<400> 78

Ser	Phe	Glu	Asn	Ser	Pro	Val	Phe	Asp	Phe	Leu	Ser	Pro	Phe	Gly	Pro
1				5					10					15	
Ala	Pro	Asn	Gln	Trp	Val	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa
			20					25					30		
Xaa	Xaa	Xaa	Xaa	Xaa	Val	Gly	Leu	Gly	Ser	Tyr	Ser	Gly	Phe	Asn	Thr
		35					40					45			
Pro	Pro	Met	Tyr	Gly	Asp	Phe	Glu	Ala	Gln	Arg	His	Trp	Met	Glu	Ile
		50				55					60				
Thr	Gln	His	Leu	Ser	Ile	Glu	Lys	Trp	Tyr	Phe	Tyr	Asp	Leu	Gln	Tyr
65					70				75					80	
Trp	Gly	Leu	Asp	Tyr	Pro	Pro	Leu	Thr	Ala	Phe	His	Ser	Tyr	Phe	Phe
			85					90					95		
Gly	Lys	Leu	Gly	Ser	Phe	Ile	Asn	Pro	Ala	Trp	Phe	Ala	Leu	Asp	Val
		100					105					110			
Ser	Arg	Gly	Phe	Glu	Ser	Val	Asp	Leu	Lys	Ser	Tyr	Met	Arg	Ala	Thr
		115					120				125				
Ala	Ile	Leu	Ser	Glu	Leu	Leu	Cys	Phe	Ile	Pro	Ala	Val	Ile	Trp	Tyr
		130				135				140					
Cys	Arg	Trp	Met	Gly	Leu	Asn	Tyr	Phe	Asn	Gln	Asn	Ala	Ile	Glu	Gln
145				150				155				160			
Thr	Ile	Ile	Ala	Ser	Ala	Ile	Leu	Phe	Asn	Pro	Ser	Leu	Ile	Ile	Ile
		165					170				175				
Asp	His	Gly	His	Phe	Gln	Tyr	Asn	Ser	Val	Met	Leu	Gly	Phe	Ala	Leu
		180					185				190				
Leu	Ser	Ile	Leu	Asn	Leu	Leu	Tyr	Asp	Asn	Phe	Ala	Leu	Ala	Ala	Ile
		195				200				205					
Phe	Phe	Val	Leu	Ser	Ile	Ser	Phe	Lys	Gln	Met	Ala	Leu	Tyr	Tyr	Ser
	210					215				220					
Pro	Ile	Met	Phe	Phe	Tyr	Met	Leu	Ser	Val	Ser	Cys	Trp	Pro	Leu	Lys

225		230		235		240
Asn Phe Asn Leu Leu Arg Leu Ala Thr Ile Ser Ile Ala Val Leu Leu						
	245		250		255	
Thr Phe Ala Thr Leu Leu Leu Pro Phe Val Leu Val Asp Gly Met Ser						
	260		265		270	
Gln Ile Gly Gln Ile Leu Phe Arg Val Phe Pro Phe Ser Arg Gly Leu						
	275		280		285	
Phe Glu Asp Lys Val Ala Asn Phe Trp Cys Thr Thr Asn Ile Leu Val						
	290		295		300	
Lys Tyr Lys Gln Leu Phe Thr Asp Lys Thr Leu Thr Arg Ile Ser Leu						
305		310		315		320
Val Ala Thr Leu Ile Ala Ile Ser Pro Ser Cys Phe Ile Ile Phe Thr						
	325		330		335	
His Pro Lys Lys Val Leu Leu Pro Trp Ala Phe Ala Ala Cys Ser Trp						
	340		345		350	
Ala Phe Tyr Leu Phe Ser Phe Gln Val His Glu Lys Ser Xaa Xaa Xaa						
	355		360		365	
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Glu Lys Asp Leu Asp Ile						
	370		375		380	
Ile Ser Met Val Cys Trp Ile Ser Asn Ile Ala Phe Phe Ser Met Trp						
385		390		395		400
Pro Leu Leu Lys Arg Asp Gly Leu Ala Leu Glu Tyr Phe Val Leu Gly						
	405		410		415	
Ile Leu Ser Asn Trp Leu Ile Gly Asn Leu Asn Trp Ile Ser Lys Trp						
	420		425		430	
Leu Val Pro Ser Phe Leu Ile Pro Gly Pro Thr Leu Ser Lys Lys Val						
	435		440		445	
Pro Lys Arg Asp Thr Lys Thr Val Val His Thr His Trp Phe Trp Gly						
	450		455		460	
Ser Val Thr Phe Val Ser Tyr Leu Gly Ala Thr Val Ile Gln Phe Val						
465		470		475		480
Asp Trp Leu Tyr Leu Pro Pro Ala Lys Tyr Pro Asp Leu Trp Val Ile						
	485		490		495	
Leu Asn Thr Thr Leu Ser Phe Ala Cys Phe Gly Leu Phe Trp Leu Trp						
	500		505		510	
Ile Asn Tyr Asn Leu Tyr Ile Leu Arg Asp Phe Lys Leu Lys Asp						
	515		520		525	



&lt;210&gt; 79

&lt;211&gt; 528

&lt;212&gt; PRT

<213> *Saccharomyces cerevisiae*

&lt;400&gt; 79

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Ser Phe Tyr Ala Ser Pro Met Tyr Asp Phe Leu Tyr Pro Phe Arg Pro
 1              5              10              15
Val Gly Asn Gln Trp Leu Pro Glu Tyr Ile Ile Phe Val Cys Ala Val
      20              25              30
Ile Leu Arg Cys Thr Ile Gly Leu Gly Pro Tyr Ser Gly Lys Gly Ser
      35              40              45
Pro Pro Leu Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Ile
      50              55              60
Thr Gln His Leu Pro Leu Ser Lys Trp Tyr Trp Tyr Asp Leu Gln Tyr
65              70              75              80
Trp Gly Leu Asp Tyr Pro Pro Leu Thr Ala Phe His Ser Tyr Leu Leu
      85              90              95
Gly Leu Ile Gly Ser Phe Phe Asn Pro Ser Trp Phe Ala Leu Glu Lys
      100             105             110
Ser Arg Gly Phe Glu Ser Pro Asp Asn Gly Leu Lys Thr Tyr Met Arg
      115             120             125
Ser Thr Val Ile Ile Ser Asp Ile Leu Phe Tyr Phe Pro Ala Val Ile
      130             135             140
Tyr Phe Thr Lys Trp Leu Gly Arg Tyr Arg Asn Gln Ser Pro Ile Gly
145             150             155             160
Gln Ser Ile Ala Ala Ser Ala Ile Leu Phe Gln Pro Ser Leu Met Leu
      165             170             175
Ile Asp His Gly His Phe Gln Tyr Asn Ser Val Met Leu Gly Leu Thr
      180             185             190
Ala Tyr Ala Ile Asn Asn Leu Leu Asp Glu Tyr Tyr Ala Met Ala Ala
      195             200             205
Val Cys Phe Val Leu Ser Ile Cys Phe Lys Gln Met Ala Leu Tyr Tyr
      210             215             220
Ala Pro Ile Phe Phe Ala Tyr Leu Leu Ser Arg Ser Leu Leu Phe Pro

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225		230		235		240
Lys	Phe	Asn	Ile	Ala	Arg	Leu
		245		250		255
Thr	Phe	Ala	Ile	Ile	Phe	Ala
		260		265		270
Lys	Asn	Ile	His	Gln	Cys	Ile
		275		280		285
Ile	Phe	Glu	Asp	Lys	Val	Ala
		290		295		300
Val	Lys	Tyr	Lys	Glu	Arg	Phe
		305		310		315
Leu	Ile	Ala	Thr	Val	Ile	Gly
		325		330		335
Leu	His	Pro	Lys	Lys	His	Leu
		340		345		350
Met	Ser	Phe	Phe	Leu	Phe	Ser
		355		360		365
Ile	Pro	Leu	Leu	Pro	Ile	Thr
		370		375		380
Val	Leu	Ser	Leu	Val	Ser	Trp
		385		390		395
Trp	Pro	Leu	Leu	Lys	Lys	Asp
		405		410		415
Phe	Leu	Leu	Ser	Asn	Trp	Leu
		420		425		430
Arg	Phe	Leu	Pro	Lys	Ser	Leu
		435		440		445
Asn	Ser	Asp	Tyr	Arg	Arg	Arg
		450		455		460
Lys	Ser	Phe	Ile	Ile	Gly	Thr
		465		470		475
Leu	Asp	Gln	Phe	Val	Ala	Pro
		485		490		495
Leu	Leu	Asn	Cys	Ala	Val	Gly
		500		505		510
Trp	Ser	Tyr	Tyr	Lys	Ile	Phe
		515		520		525

<210> 80  
 <211> 511  
 <212> PRT  
 <213> *Pichia pastoris*

<220>  
 <221> MOD\_RES  
 <222> (22)...(36)  
 <223> Xaa is a variable amino acid

<220>  
 <221> MOD\_RES  
 <222> (365)...(377)  
 <223> Xaa is a variable amino acid

<400> 80  
 Phe Glu Asn Ser Pro Val Phe Asp Phe Leu Ser Pro Phe Gly Pro Ala  
 1 5 10 15  
 Pro Asn Gln Trp Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa  
 20 25 30  
 Xaa Xaa Xaa Xaa Val Gly Leu Gly Ser Tyr Ser Gly Phe Asn Thr Pro  
 35 40 45  
 Pro Met Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Ile Thr  
 50 55 60  
 Gln His Leu Ser Ile Glu Lys Trp Tyr Phe Tyr Asp Leu Gln Tyr Trp  
 65 70 75 80  
 Gly Leu Asp Tyr Pro Pro Leu Thr Ala Phe His Ser Tyr Phe Phe Gly  
 85 90 95  
 Lys Leu Gly Ser Phe Ile Asn Pro Ala Trp Phe Ala Leu Asp Val Ser  
 100 105 110  
 Arg Gly Phe Glu Ser Val Asp Leu Lys Ser Tyr Met Arg Ala Thr Ala  
 115 120 125  
 Ile Leu Ser Glu Leu Leu Cys Phe Ile Pro Ala Val Ile Trp Tyr Cys  
 130 135 140  
 Arg Trp Met Gly Leu Asn Tyr Phe Asn Gln Asn Ala Ile Glu Gln Thr

145		150		155		160									
Ile	Ile	Ala	Ser	Ala	Ile	Leu	Phe	Asn	Pro	Ser	Leu	Ile	Ile	Ile	Asp
		165		170		175									
His	Gly	His	Phe	Gln	Tyr	Asn	Ser	Val	Met	Leu	Gly	Phe	Ala	Leu	Leu
		180		185		190									
Ser	Ile	Leu	Asn	Leu	Leu	Tyr	Asp	Asn	Phe	Ala	Leu	Ala	Ala	Ile	Phe
		195		200		205									
Phe	Val	Leu	Ser	Ile	Ser	Phe	Lys	Gln	Met	Ala	Leu	Tyr	Tyr	Ser	Pro
		210		215		220									
Ile	Met	Phe	Phe	Tyr	Met	Leu	Ser	Val	Ser	Cys	Trp	Pro	Leu	Lys	Asn
		225		230		235									
Phe	Asn	Leu	Leu	Arg	Leu	Ala	Thr	Ile	Ser	Ile	Ala	Val	Leu	Leu	Thr
		245		250		255									
Phe	Ala	Thr	Leu	Leu	Leu	Pro	Phe	Val	Leu	Val	Asp	Gly	Met	Ser	Gln
		260		265		270									
Ile	Gly	Gln	Ile	Leu	Phe	Arg	Val	Phe	Pro	Phe	Ser	Arg	Gly	Leu	Phe
		275		280		285									
Glu	Asp	Lys	Val	Ala	Asn	Phe	Trp	Cys	Thr	Thr	Asn	Ile	Leu	Val	Lys
		290		295		300									
Tyr	Lys	Gln	Leu	Phe	Thr	Asp	Lys	Thr	Leu	Thr	Arg	Ile	Ser	Leu	Val
		305		310		315									
Ala	Thr	Leu	Ile	Ala	Ile	Ser	Pro	Ser	Cys	Phe	Ile	Ile	Phe	Thr	His
		325		330		335									
Pro	Lys	Lys	Val	Leu	Leu	Pro	Trp	Ala	Phe	Ala	Ala	Cys	Ser	Trp	Ala
		340		345		350									
Phe	Tyr	Leu	Phe	Ser	Phe	Gln	Val	His	Glu	Lys	Ser	Xaa	Xaa	Xaa	Xaa
		355		360		365									
Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Xaa	Glu	Lys	Asp	Leu	Asp	Ile	Ile
		370		375		380									
Ser	Met	Val	Cys	Trp	Ile	Ser	Asn	Ile	Ala	Phe	Phe	Ser	Met	Trp	Pro
		385		390		395									
Leu	Leu	Lys	Arg	Asp	Gly	Leu	Ala	Leu	Glu	Tyr	Phe	Val	Leu	Gly	Ile
		405		410		415									
Leu	Ser	Asn	Trp	Leu	Ile	Gly	Asn	Leu	Asn	Trp	Ile	Ser	Lys	Trp	Leu
		420		425		430									
Val	Pro	Ser	Phe	Leu	Ile	Pro	Gly	Pro	Thr	Leu	Ser	Lys	Lys	Val	Pro
		435		440		445									

Lys Arg Asp Thr Lys Thr Val Val His Thr His Trp Phe Trp Gly Ser  
 450 455 460  
 Val Thr Phe Val Ser Tyr Leu Gly Ala Thr Val Ile Gln Phe Val Asp  
 465 470 475 480  
 Trp Leu Tyr Leu Pro Pro Ala Lys Tyr Pro Asp Leu Trp Val Ile Leu  
 485 490 495  
 Asn Thr Thr Leu Ser Phe Ala Cys Phe Gly Leu Phe Trp Leu Trp  
 500 505 510

<210> 81

<211> 480

<212> PRT

<213> Schizosaccharomyces pombe

<400> 81

Phe Glu Asn Gly Ala Pro Val Gln Gln Phe Val Ser Arg Phe Arg Ser  
 1 5 10 15  
 Tyr Ser Ser Lys Phe Leu Phe Phe Pro Cys Leu Ile Met Ser Leu Val  
 20 25 30  
 Phe Met Gln Trp Leu Ile Ser Ile Gly Pro Tyr Ser Gly Tyr Asn Thr  
 35 40 45  
 Pro Pro Met Tyr Gly Asp Phe Glu Ala Gln Arg His Trp Met Glu Leu  
 50 55 60  
 Thr Leu His Thr Pro Val Ser Gln Trp Tyr Phe Arg Asp Leu Gln Trp  
 65 70 75 80  
 Trp Gly Leu Asp Tyr Pro Pro Leu Thr Ala Tyr Val Ser Trp Phe Phe  
 85 90 95  
 Gly Ile Ile Gly His Tyr Phe Phe Asn Pro Glu Trp Phe Ala Asp Val  
 100 105 110  
 Thr Ser Arg Gly Phe Glu Ser Leu Glu Leu Lys Leu Phe Met Arg Ser  
 115 120 125  
 Thr Val Ile Ala Ser His Leu Leu Ile Leu Val Pro Pro Leu Met Phe  
 130 135 140  
 Tyr Ser Lys Trp Trp Ser Arg Arg Ile Pro Asn Phe Val Asp Arg Asn  
 145 150 155 160  
 Ala Ser Leu Ile Met Val Leu Phe Gln Pro Ala Leu Leu Leu Ile Asp

	165		170		175
His Gly His Phe Gln Tyr Asn Cys Val Met Leu Gly Leu Val Met Tyr					
	180		185		190
Ala Ile Ala Asn Leu Leu Lys Asn Gln Tyr Val Ala Ala Thr Phe Phe					
	195		200		205
Phe Cys Leu Ala Leu Thr Phe Lys Gln Met Ala Leu Tyr Phe Ala Pro					
	210		215		220
Pro Ile Phe Phe Tyr Leu Leu Gly Thr Cys Val Lys Pro Lys Ile Arg					
225		230		235	240
Phe Ser Arg Phe Ile Leu Leu Ser Val Thr Val Val Phe Thr Phe Ser					
	245		250		255
Leu Ile Leu Phe Pro Trp Ile Tyr Met Asp Tyr Lys Thr Leu Leu Pro					
	260		265		270
Gln Ile Leu His Arg Val Phe Pro Phe Ala Arg Gly Leu Trp Glu Asp					
	275		280		285
Lys Val Ala Asn Phe Trp Cys Thr Leu Asn Thr Val Phe Lys Ile Arg					
	290		295		300
Glu Val Phe Thr Leu His Gln Leu Gln Val Ile Ser Leu Ile Phe Thr					
305		310		315	320
Leu Ile Ser Ile Leu Pro Ser Cys Val Ile Leu Phe Leu Tyr Pro Arg					
	325		330		335
Lys Arg Leu Leu Ala Leu Gly Phe Ala Ser Ala Ser Trp Gly Phe Phe					
	340		345		350
Leu Phe Ser Phe Gln Val His Glu Lys Ser Val Leu Leu Pro Leu Leu					
	355		360		365
Pro Thr Ser Ile Leu Leu Cys His Gly Asn Ile Thr Thr Lys Pro Trp					
	370		375		380
Ile Ala Leu Ala Asn Asn Leu Ala Val Phe Ser Leu Trp Pro Leu Leu					
385		390		395	400
Lys Lys Asp Gly Leu Gly Leu Gln Tyr Phe Thr Leu Val Leu Met Trp					
	405		410		415
Asn Trp Ile Gly Asp Met Val Val Phe Ser Lys Asn Val Leu Phe Arg					
	420		425		430
Phe Ile Gln Leu Ser Phe Tyr Val Gly Met Ile Val Ile Leu Gly Ile					
	435		440		445
Asp Leu Phe Ile Pro Pro Pro Ser Arg Tyr Pro Asp Leu Trp Val Ile					
	450		455		460

Leu Asn Val Thr Leu Ser Phe Ala Gly Phe Phe Thr Ile Tyr Leu Trp  
 465 470 475 480

<210> 82

<211> 477

<212> PRT

<213> *Pichia pastoris*

<220>

<221> MOD\_RES

<222> (329)...(341)

<223> Xaa is a variable amino acid

<400> 82

Val Gly Leu Gly Ser Tyr Ser Gly Phe Asn Thr Pro Pro Met Tyr Gly  
 1 5 10 15  
 Asp Phe Glu Ala Gln Arg His Trp Met Glu Ile Thr Gln His Leu Ser  
 20 25 30  
 Ile Glu Lys Trp Tyr Phe Tyr Asp Leu Gln Tyr Trp Gly Leu Asp Tyr  
 35 40 45  
 Pro Pro Leu Thr Ala Phe His Ser Tyr Phe Phe Gly Lys Leu Gly Ser  
 50 55 60  
 Phe Ile Asn Pro Ala Trp Phe Ala Leu Asp Val Ser Arg Gly Phe Glu  
 65 70 75 80  
 Ser Val Asp Leu Lys Ser Tyr Met Arg Ala Thr Ala Ile Leu Ser Glu  
 85 90 95  
 Leu Leu Cys Phe Ile Pro Ala Val Ile Trp Tyr Cys Arg Trp Met Gly  
 100 105 110  
 Leu Asn Tyr Phe Asn Gln Asn Ala Ile Glu Gln Thr Ile Ile Ala Ser  
 115 120 125  
 Ala Ile Leu Phe Asn Pro Ser Leu Ile Ile Ile Asp His Gly His Phe  
 130 135 140  
 Gln Tyr Asn Ser Val Met Leu Gly Phe Ala Leu Leu Ser Ile Leu Asn  
 145 150 155 160  
 Leu Leu Tyr Asp Asn Phe Ala Leu Ala Ala Ile Phe Phe Val Leu Ser  
 165 170 175

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Ile Ser Phe Lys Gln Met Ala Leu Tyr Tyr Ser Pro Ile Met Phe Phe
      180                      185                      190
Tyr Met Leu Ser Val Ser Cys Trp Pro Leu Lys Asn Phe Asn Leu Leu
      195                      200                      205
Arg Leu Ala Thr Ile Ser Ile Ala Val Leu Leu Thr Phe Ala Thr Leu
      210                      215                      220
Leu Leu Pro Phe Val Leu Val Asp Gly Met Ser Gln Ile Gly Gln Ile
225                      230                      235                      240
Leu Phe Arg Val Phe Pro Phe Ser Arg Gly Leu Phe Glu Asp Lys Val
      245                      250                      255
Ala Asn Phe Trp Cys Thr Thr Asn Ile Leu Val Lys Tyr Lys Gln Leu
      260                      265                      270
Phe Thr Asp Lys Thr Leu Thr Arg Ile Ser Leu Val Ala Thr Leu Ile
      275                      280                      285
Ala Ile Ser Pro Ser Cys Phe Ile Ile Phe Thr His Pro Lys Lys Val
      290                      295                      300
Leu Leu Pro Trp Ala Phe Ala Ala Cys Ser Trp Ala Phe Tyr Leu Phe
305                      310                      315                      320
Ser Phe Gln Val His Glu Lys Ser Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
      325                      330                      335
Xaa Xaa Xaa Xaa Xaa Glu Lys Asp Leu Asp Ile Ile Ser Met Val Cys
      340                      345                      350
Trp Ile Ser Asn Ile Ala Phe Phe Ser Met Trp Pro Leu Leu Lys Arg
      355                      360                      365
Asp Gly Leu Ala Leu Glu Tyr Phe Val Leu Gly Ile Leu Ser Asn Trp
      370                      375                      380
Leu Ile Gly Asn Leu Asn Trp Ile Ser Lys Trp Leu Val Pro Ser Phe
385                      390                      395                      400
Leu Ile Pro Gly Pro Thr Leu Ser Lys Lys Val Pro Lys Arg Asp Thr
      405                      410                      415
Lys Thr Val Val His Thr His Trp Phe Trp Gly Ser Val Thr Phe Val
      420                      425                      430
Ser Tyr Leu Gly Ala Thr Val Ile Gln Phe Val Asp Trp Leu Tyr Leu
      435                      440                      445
Pro Pro Ala Lys Tyr Pro Asp Leu Trp Val Ile Leu Asn Thr Thr Leu
      450                      455                      460
Ser Phe Ala Cys Phe Gly Leu Phe Trp Leu Trp Ile Asn

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465

470

475

&lt;210&gt; 83

&lt;211&gt; 448

&lt;212&gt; PRT

<213> *Drosophila melanogaster*

&lt;400&gt; 83

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Ile Ser Leu Tyr Ser Tyr Ser Gly Phe Asp Ser Pro Pro Met His Gly
 1             5             10             15
Asp Tyr Glu Ala Gln Arg His Trp Gln Glu Ile Thr Val Asn Leu Ala
      20             25             30
Val Gly Glu Trp Tyr Thr Asn Ser Ser Asn Asn Asp Leu Gln Tyr Trp
      35             40             45
Gly Leu Asp Tyr Pro Pro Leu Thr Ala Tyr His Ser Tyr Leu Val Gly
      50             55             60
Arg Ile Gly Ala Ser Ile Asp Pro Arg Phe Val Glu Leu His Lys Ser
65             70             75             80
Arg Gly Phe Glu Ser Lys Glu His Lys Arg Phe Met Arg Ala Thr Val
      85             90             95
Val Ser Ala Asp Val Leu Ile Tyr Leu Pro Ala Met Leu Leu Leu Ala
      100            105            110
Tyr Ser Leu Asp Lys Ala Phe Arg Ser Asp Asp Lys Leu Phe Leu Phe
      115            120            125
Thr Leu Val Ala Ala Tyr Pro Gly Gln Thr Leu Ile Asp Asn Gly His
      130            135            140
Phe Gln Tyr Asn Asn Ile Ser Leu Gly Phe Ala Ala Val Ala Ile Ala
145            150            155            160
Ala Ile Leu Arg Arg Arg Phe Tyr Ala Ala Ala Phe Phe Phe Thr Leu
      165            170            175
Ala Leu Asn Tyr Lys Gln Met Glu Leu Tyr His Ser Leu Pro Phe Phe
      180            185            190
Ala Phe Leu Leu Gly Glu Cys Val Ser Gln Lys Ser Phe Ala Ser Phe
      195            200            205
Ile Ala Glu Ile Ser Arg Ile Ala Ala Val Val Leu Gly Thr Phe Ala
      210            215            220

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Ile Leu Trp Val Pro Trp Leu Gly Ser Leu Gln Ala Val Leu Gln Val
225                230                235                240
Leu His Arg Leu Phe Pro Val Ala Arg Gly Val Phe Glu Asp Lys Val
                245                250                255
Ala Asn Val Trp Cys Ala Val Asn Val Val Trp Lys Leu Lys Lys His
                260                265                270
Ile Ser Asn Asp Gln Met Ala Leu Val Cys Ile Ala Cys Thr Leu Ile
                275                280                285
Ala Ser Leu Pro Thr Asn Val Leu Leu Phe Arg Arg Arg Thr Asn Val
                290                295                300
Gly Phe Leu Leu Ala Leu Phe Asn Thr Ser Leu Ala Phe Phe Leu Phe
305                310                315                320
Ser Phe Gln Val His Glu Lys Thr Ile Leu Leu Thr Ala Leu Pro Ala
                325                330                335
Leu Phe Leu Leu Lys Cys Trp Pro Asp Glu Met Ile Leu Phe Leu Glu
                340                345                350
Val Thr Val Phe Ser Met Leu Pro Leu Leu Ala Arg Asp Glu Leu Leu
                355                360                365
Val Pro Ala Val Val Ala Thr Val Ala Phe His Leu Ile Phe Lys Cys
                370                375                380
Phe Asp Ser Lys Ser Lys Leu Ser Asn Glu Tyr Pro Leu Lys Tyr Ile
385                390                395                400
Ala Asn Ile Ser Gln Ile Leu Met Ile Ser Val Val Val Ala Ser Leu
                405                410                415
Thr Val Pro Ala Pro Thr Lys Tyr Pro Asp Leu Trp Pro Leu Ile Ile
                420                425                430
Ser Val Thr Ser Cys Gly His Phe Phe Leu Phe Phe Leu Trp Gly Asn
                435                440                445

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&lt;210&gt; 84

&lt;211&gt; 478

&lt;212&gt; PRT

<213> *Pichia pastoris*

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (324)...(336)

&lt;223&gt; Xaa is a variable amino acid

&lt;400&gt; 84

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Tyr Ser Gly Phe Asn Thr Pro Pro Met Tyr Gly Asp Phe Glu Ala Gln
 1           5           10           15
Arg His Trp Met Glu Ile Thr Gln His Leu Ser Ile Glu Lys Trp Tyr
      20           25           30
Phe Tyr Asp Leu Gln Tyr Trp Gly Leu Asp Tyr Pro Pro Leu Thr Ala
      35           40           45
Phe His Ser Tyr Phe Phe Gly Lys Leu Gly Ser Phe Ile Asn Pro Ala
      50           55           60
Trp Phe Ala Leu Asp Val Ser Arg Gly Phe Glu Ser Val Asp Leu Lys
65           70           75           80
Ser Tyr Met Arg Ala Thr Ala Ile Leu Ser Glu Leu Leu Cys Phe Ile
      85           90           95
Pro Ala Val Ile Trp Tyr Cys Arg Trp Met Gly Leu Asn Tyr Phe Asn
      100          105          110
Gln Asn Ala Ile Glu Gln Thr Ile Ile Ala Ser Ala Ile Leu Phe Asn
      115          120          125
Pro Ser Leu Ile Ile Ile Asp His Gly His Phe Gln Tyr Asn Ser Val
      130          135          140
Met Leu Gly Phe Ala Leu Leu Ser Ile Leu Asn Leu Leu Tyr Asp Asn
      145          150          155          160
Phe Ala Leu Ala Ala Ile Phe Phe Val Leu Ser Ile Ser Phe Lys Gln
      165          170          175
Met Ala Leu Tyr Tyr Ser Pro Ile Met Phe Phe Tyr Met Leu Ser Val
      180          185          190
Ser Cys Trp Pro Leu Lys Asn Phe Asn Leu Leu Arg Leu Ala Thr Ile
      195          200          205
Ser Ile Ala Val Leu Leu Thr Phe Ala Thr Leu Leu Leu Pro Phe Val
      210          215          220
Leu Val Asp Gly Met Ser Gln Ile Gly Gln Ile Leu Phe Arg Val Phe
      225          230          235          240
Pro Phe Ser Arg Gly Leu Phe Glu Asp Lys Val Ala Asn Phe Trp Cys
      245          250          255
Thr Thr Asn Ile Leu Val Lys Tyr Lys Gln Leu Phe Thr Asp Lys Thr

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Arg His Trp Met Glu Ile Thr Thr Asn Leu Pro Val Ile Asp Trp Tyr  
 20 25 30  
 Arg Asn Gly Thr Tyr Asn Asp Leu Thr Tyr Trp Gly Leu Asp Tyr Pro  
 35 40 45  
 Pro Leu Thr Ala Tyr Gln Ser Tyr Ile His Gly Ile Phe Leu Arg Phe  
 50 55 60  
 Phe Asn Pro Glu Ser Val Ala Leu Leu Ser Ser Arg Gly His Glu Ser  
 65 70 75 80  
 Tyr Leu Gly Lys Leu Leu Met Arg Trp Thr Val Leu Ser Ser Asp Ala  
 85 90 95  
 Phe Ile Phe Phe Pro Ala Ala Leu Phe Phe Val Leu Val Tyr His Arg  
 100 105 110  
 Asn Arg Thr Arg Gly Gly Lys Ser Glu Val Ala Trp His Ile Ala Met  
 115 120 125  
 Ile Leu Leu Asn Pro Cys Leu Ile Leu Ile Asp His Gly His Phe Gln  
 130 135 140  
 Tyr Asn Cys Ile Ser Leu Gly Leu Thr Val Gly Ala Ile Ala Ala Val  
 145 150 155 160  
 Leu Cys Glu Ser Glu Val Leu Thr Cys Val Leu Phe Ser Leu Ala Leu  
 165 170 175  
 Ser His Lys Gln Met Ser Ala Tyr Phe Ala Pro Ala Phe Phe Ser His  
 180 185 190  
 Leu Leu Gly Lys Cys Leu Arg Arg Lys Ser Pro Ile Leu Ser Val Ile  
 195 200 205  
 Lys Leu Gly Ile Ala Val Ile Val Thr Phe Val Ile Phe Trp Trp Pro  
 210 215 220  
 Tyr Val His Ser Leu Asp Asp Phe Leu Met Val Leu Ser Arg Leu Ala  
 225 230 235 240  
 Pro Phe Glu Arg Gly Ile Tyr Glu Asp Tyr Val Ala Asn Phe Trp Cys  
 245 250 255  
 Thr Thr Ser Ile Leu Ile Lys Trp Lys Asn Leu Phe Thr Thr Gln Ser  
 260 265 270  
 Leu Lys Ser Ile Ser Leu Ala Ala Thr Ile Leu Ala Ser Leu Pro Ser  
 275 280 285  
 Met Val Gln Gln Ile Leu Ser Pro Ser Asn Glu Gly Phe Leu Tyr Gly  
 290 295 300  
 Leu Leu Asn Ser Ser Met Ala Phe Tyr Leu Phe Ser Phe Gln Val His

305	310	315	320
Glu Lys Ser Ile Leu Met Pro Phe Leu Ser Ala Thr Leu Leu Ala Leu			
	325	330	335
Lys Leu Pro Asp His Phe Ser His Leu Thr Tyr Tyr Ala Leu Phe Ser			
	340	345	350
Met Phe Pro Leu Leu Cys Arg Asp Lys Leu Leu Ile Pro Tyr Leu Thr			
	355	360	365
Leu Ser Phe Leu Phe Thr Val Ile Tyr His Ser Pro Gly Asn His His			
	370	375	380
Ala Ile Gln Lys Thr Asp Val Ser Phe Phe Ser Phe Lys Asn Phe Pro			
385	390	395	400
Gly Tyr Val Phe Leu Leu Arg Thr His Phe Phe Ile Ser Val Val Leu			
	405	410	415
His Val Leu Tyr Leu Thr Ile Lys Pro Pro Gln Lys Tyr Pro Phe Leu			
	420	425	430
Phe Glu Ala Leu Ile Met Ile Leu Cys Phe Ser Tyr Phe Ile Met Phe			
	435	440	445
Ala Phe Tyr Thr Asn Tyr Thr Gln Trp Thr Leu			
450	455		

&lt;210&gt; 86

&lt;211&gt; 836

&lt;212&gt; DNA

&lt;213&gt; Kluyveromyces lactis

&lt;400&gt; 86

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atctctgttt caacagctct tgcattcatt gggtctttcg gtccaatcta tatctttgga 60
ggatacaaga acttagtgca atcaatgcac aggatttttc catttgccag gggtatcttt 120
gaagataaag ttgcgaattt ttggtgcggt tctaataattt tcatcaaata tagaaatcta 180
ttcactcaga aggatcttca attatactca ttactcgcaa cagttattgg gcttttacca 240
tcattcatta taacatTTTT ataccgaag agacatttac taccatatgc tttggccgca 300
tgttcgatgt cattcttctt attcagcttc cagggttcag aaaagacaat cttattacct 360
ttacttccta ttacactctt gtacacgtca agagattgga atgttctatc attggtttgt 420
tggattaaca acgtggcatt gtttacactc tggccattac tgaaaaagga caatctagta 480
ttgcaatatg gagtcatggt catgttttagc aattgggtga tcggtaactt cagtttcgtc 540
acaccagct tcctcccaaa atttttgaca ccagggccat ccatcagtga tatagatgtt 600

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gattatagac gggcaagttt actaccaag agcctaatat ggagattaat cattgttggc 660  
 tcatatattg caatggggat tattcatttt ctgactatt acgtctcccc gccatcaaaa 720  
 taccctgatt tatgggtgct tgccaattgt tccttgggct tctcatgttt tgtgacattt 780  
 tggatatgga acaattataa ttattcgaaa tgagaaacag cactttgcaa gattta 836

<210> 87

<211> 277

<212> PRT

<213> Kluyveromyces lactis

<400> 87

Ile Ser Val Ser Thr Ala Leu Ala Phe Ile Gly Ser Phe Gly Pro Ile  
 1 5 10 15  
 Tyr Ile Phe Gly Gly Tyr Lys Asn Leu Val Gln Ser Met His Arg Ile  
 20 25 30  
 Phe Pro Phe Ala Arg Gly Ile Phe Glu Asp Lys Val Ala Asn Phe Trp  
 35 40 45  
 Cys Val Ser Asn Ile Phe Ile Lys Tyr Arg Asn Leu Phe Thr Gln Lys  
 50 55 60  
 Asp Leu Gln Leu Tyr Ser Leu Leu Ala Thr Val Ile Gly Leu Leu Pro  
 65 70 75 80  
 Ser Phe Ile Ile Thr Phe Leu Tyr Pro Lys Arg His Leu Leu Pro Tyr  
 85 90 95  
 Ala Leu Ala Ala Cys Ser Met Ser Phe Phe Leu Phe Ser Phe Gln Val  
 100 105 110  
 His Glu Lys Thr Ile Leu Leu Pro Leu Leu Pro Ile Thr Leu Leu Tyr  
 115 120 125  
 Thr Ser Arg Asp Trp Asn Val Leu Ser Leu Val Cys Trp Ile Asn Asn  
 130 135 140  
 Val Ala Leu Phe Thr Leu Trp Pro Leu Leu Lys Lys Asp Asn Leu Val  
 145 150 155 160  
 Leu Gln Tyr Gly Val Met Phe Met Phe Ser Asn Trp Leu Ile Gly Asn  
 165 170 175  
 Phe Ser Phe Val Thr Pro Arg Phe Leu Pro Lys Phe Leu Thr Pro Gly  
 180 185 190  
 Pro Ser Ile Ser Asp Ile Asp Val Asp Tyr Arg Arg Ala Ser Leu Leu  
 195 200 205

Pro Lys Ser Leu Ile Trp Arg Leu Ile Ile Val Gly Ser Tyr Ile Ala  
           210                          215                          220  
 Met Gly Ile Ile His Phe Leu Asp Tyr Tyr Val Ser Pro Pro Ser Lys  
 225                          230                          235                          240  
 Tyr Pro Asp Leu Trp Val Leu Ala Asn Cys Ser Leu Gly Phe Ser Cys  
                           245                          250                          255  
 Phe Val Thr Phe Trp Ile Trp Asn Asn Tyr Asn Tyr Ser Lys Glu Thr  
                           260                          265                          270  
 Ala Leu Cys Lys Ile  
                           275

<210> 88  
 <211> 284  
 <212> PRT  
 <213> Kluyveromyces lactis

<220>  
 <221> MOD\_RES  
 <222> (116)...(127)  
 <223> Xaa is a variable amino acid

<220>  
 <221> MOD\_RES  
 <222> 271  
 <223> Xaa is a variable amino acid

<400> 88  
 Ile Ser Val Ser Thr Ala Leu Ala Phe Ile Gly Ser Phe Gly Pro Ile  
   1                          5                          10                          15  
 Tyr Ile Phe Gly Gly Tyr Lys Asn Leu Val Gln Ser Met His Arg Ile  
                           20                          25                          30  
 Phe Pro Phe Ala Arg Gly Ile Phe Glu Asp Lys Val Ala Asn Phe Trp  
                           35                          40                          45  
 Cys Val Ser Asn Ile Phe Ile Lys Tyr Arg Asn Leu Phe Thr Gln Lys  
                           50                          55                          60  
 Asp Leu Gln Leu Tyr Ser Leu Leu Ala Thr Val Ile Gly Leu Leu Pro





Tyr Phe Leu Gly Gly Gly Leu Lys Asn Ile His Gln Cys Ile His Arg  
 20 25 30  
 Ile Phe Pro Phe Ala Arg Gly Ile Phe Glu Asp Lys Val Ala Asn Phe  
 35 40 45  
 Trp Cys Val Thr Asn Val Phe Val Lys Tyr Lys Glu Arg Phe Thr Ile  
 50 55 60  
 Gln Gln Leu Gln Leu Tyr Ser Leu Ile Ala Thr Val Ile Gly Phe Leu  
 65 70 75 80  
 Pro Ala Met Ile Met Thr Leu Leu His Pro Lys Lys His Leu Leu Pro  
 85 90 95  
 Tyr Val Leu Ile Ala Cys Ser Met Ser Phe Phe Leu Phe Ser Phe Gln  
 100 105 110  
 Val His Glu Lys Thr Ile Leu Ile Pro Leu Leu Pro Ile Thr Leu Leu  
 115 120 125  
 Tyr Ser Ser Thr Asp Trp Asn Val Leu Ser Leu Val Ser Trp Ile Asn  
 130 135 140  
 Asn Val Ala Leu Phe Thr Leu Trp Pro Leu Leu Lys Lys Asp Gly Leu  
 145 150 155 160  
 His Leu Gln Tyr Ala Val Ser Phe Leu Leu Ser Asn Trp Leu Ile Gly  
 165 170 175  
 Asn Phe Ser Phe Ile Thr Pro Arg Phe Leu Pro Lys Ser Leu Thr Pro  
 180 185 190  
 Gly Pro Ser Ile Ser Ser Ile Asn Ser Asp Tyr Arg Arg Arg Ser Leu  
 195 200 205  
 Leu Pro Tyr Asn Val Val Trp Lys Ser Phe Ile Ile Gly Thr Tyr Ile  
 210 215 220  
 Ala Met Gly Phe Tyr His Phe Leu Asp Gln Phe Val Ala Pro Pro Ser  
 225 230 235 240  
 Lys Tyr Pro Asp Leu Trp Val Leu Leu Asn Cys Ala Val Gly Phe Ile  
 245 250 255  
 Cys Phe Ser Ile Phe Trp Leu Trp Ser Tyr Tyr Lys Ile Phe Thr Ser  
 260 265 270  
 Gly Ser Lys Ser Met Lys Asp Leu  
 275 280

&lt;210&gt; 90

&lt;211&gt; 284

&lt;212&gt; PRT

&lt;213&gt; Kluyveromyces lactis

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (116)...(127)

&lt;223&gt; Xaa is a variable amino acid

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; 271

&lt;223&gt; Xaa is a variable amino acid

&lt;400&gt; 90

Ile Ser Val Ser Thr Ala Leu Ala Phe Ile Gly Ser Phe Gly Pro Ile

1 5 10 15

Tyr Ile Phe Gly Gly Tyr Lys Asn Leu Val Gln Ser Met His Arg Ile

20 25 30

Phe Pro Phe Ala Arg Gly Ile Phe Glu Asp Lys Val Ala Asn Phe Trp

35 40 45

Cys Val Ser Asn Ile Phe Ile Lys Tyr Arg Asn Leu Phe Thr Gln Lys

50 55 60

Asp Leu Gln Leu Tyr Ser Leu Leu Ala Thr Val Ile Gly Leu Leu Pro

65 70 75 80

Ser Phe Ile Ile Thr Phe Leu Tyr Pro Lys Arg His Leu Leu Pro Tyr

85 90 95

Ala Leu Ala Ala Cys Ser Met Ser Phe Phe Leu Phe Ser Phe Gln Val

100 105 110

His Glu Lys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr

115 120 125

Thr Ser Arg Asp Trp Asn Val Leu Ser Leu Val Cys Trp Ile Asn Asn

130 135 140

Val Ala Leu Phe Thr Leu Trp Pro Leu Leu Lys Lys Asp Asn Leu Val

145 150 155 160

Leu Gln Tyr Gly Val Met Phe Met Phe Ser Asn Trp Leu Ile Gly Asn

165 170 175

Phe Ser Phe Val Thr Pro Arg Phe Leu Pro Lys Phe Leu Thr Pro Gly  
                   180                          185                          190  
 Pro Ser Ile Ser Asp Ile Asp Val Asp Tyr Arg Arg Ala Ser Leu Leu  
                   195                          200                          205  
 Pro Lys Ser Leu Ile Trp Arg Leu Ile Ile Val Gly Ser Tyr Ile Ala  
                   210                          215                          220  
 Met Gly Ile Ile His Phe Leu Asp Tyr Tyr Val Ser Pro Pro Ser Gln  
 225                          230                          235                          240  
 Glu Arg Tyr Lys Tyr Pro Asp Leu Trp Val Leu Ala Asn Cys Ser Leu  
                           245                          250                          255  
 Gly Phe Ser Cys Phe Val Thr Phe Trp Ile Trp Asn Asn Tyr Xaa Leu  
                           260                          265                          270  
 Phe Glu Arg Met Arg Asn Ser Thr Leu Gln Asp Leu  
                   275                          280

<210> 91

<211> 250

<212> PRT

<213> Schizosaccharomyces pombe

<400> 91

Leu Ser Val Thr Val Val Phe Thr Phe Ser Leu Ile Leu Phe Pro Trp  
   1                  5                          10                          15  
 Ile Tyr Met Asp Tyr Lys Thr Leu Leu Pro Gln Ile Leu His Arg Val  
                   20                          25                          30  
 Phe Pro Phe Ala Arg Gly Leu Trp Glu Asp Lys Val Ala Asn Phe Trp  
                   35                          40                          45  
 Cys Thr Leu Asn Thr Val Phe Lys Ile Arg Glu Val Phe Thr Leu His  
                   50                          55                          60  
 Gln Leu Gln Val Ile Ser Leu Ile Phe Thr Leu Ile Ser Ile Leu Pro  
 65                          70                          75                          80  
 Ser Cys Val Ile Leu Phe Leu Tyr Pro Arg Lys Arg Leu Leu Ala Leu  
                           85                          90                          95  
 Gly Phe Ala Ser Ala Ser Trp Gly Phe Phe Leu Phe Ser Phe Gln Val  
                   100                          105                          110  
 His Glu Lys Ser Val Leu Leu Pro Leu Leu Pro Thr Ser Ile Leu Leu

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      115              120              125
Cys His Gly Asn Ile Thr Thr Lys Pro Trp Ile Ala Leu Ala Asn Asn
      130              135              140
Leu Ala Val Phe Ser Leu Trp Pro Leu Leu Lys Lys Asp Gly Leu Gly
      145              150              155              160
Leu Gln Tyr Phe Thr Leu Val Leu Met Trp Asn Trp Ile Gly Asp Met
              165              170              175
Val Val Phe Ser Lys Asn Val Leu Phe Arg Phe Ile Gln Leu Ser Phe
              180              185              190
Tyr Val Gly Met Ile Val Ile Leu Gly Ile Asp Leu Phe Ile Pro Pro
              195              200              205
Pro Ser Arg Tyr Pro Asp Leu Trp Val Ile Leu Asn Val Thr Leu Ser
              210              215              220
Phe Ala Gly Phe Phe Thr Ile Tyr Leu Trp Thr Leu Gly Arg Leu Leu
      225              230              235              240
His Ile Ser Ser Lys Leu Ser Thr Asp Leu
              245              250

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<210> 92

<211> 238

<212> PRT

<213> Kluyveromyces lactis

<220>

<221> MOD\_RES

<222> (88)...(99)

<223> Xaa is a variable amino acid

<400> 92

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Met His Arg Ile Phe Pro Phe Ala Arg Gly Ile Phe Glu Asp Lys Val
  1              5              10              15
Ala Asn Phe Trp Cys Val Ser Asn Ile Phe Ile Lys Tyr Arg Asn Leu
              20              25              30
Phe Thr Gln Lys Asp Leu Gln Leu Tyr Ser Leu Leu Ala Thr Val Ile
              35              40              45
Gly Leu Leu Pro Ser Phe Ile Ile Thr Phe Leu Tyr Pro Lys Arg His

```

50	55	60
Leu Leu Pro Tyr Ala	Leu Ala Ala Cys Ser Met	Ser Phe Phe Leu Phe
65	70	75 80
Ser Phe Gln Val His	Glu Lys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa	
85	90	95
Xaa Xaa Xaa Tyr Thr	Ser Arg Asp Trp Asn Val Leu Ser Leu Val Cys	
100	105	110
Trp Ile Asn Asn Val	Ala Leu Phe Thr Leu Trp Pro Leu Leu Lys Lys	
115	120	125
Asp Asn Leu Val Leu	Gln Tyr Gly Val Met Phe Met Phe Ser Asn Trp	
130	135	140
Leu Ile Gly Asn Phe	Ser Phe Val Thr Pro Arg Phe Leu Pro Lys Phe	
145	150	155 160
Leu Thr Pro Gly Pro	Ser Ile Ser Asp Ile Asp Val Asp Tyr Arg Arg	
165	170	175
Ala Ser Leu Leu Pro	Lys Ser Leu Ile Trp Arg Leu Ile Ile Val Gly	
180	185	190
Ser Tyr Ile Ala Met	Gly Ile Ile His Phe Leu Asp Tyr Tyr Val Ser	
195	200	205
Pro Pro Ser Lys Tyr	Pro Asp Leu Trp Val Leu Ala Asn Cys Ser Leu	
210	215	220
Gly Phe Ser Cys Phe	Val Thr Phe Trp Ile Trp Asn Asn Tyr	
225	230	235

&lt;210&gt; 93

&lt;211&gt; 219

&lt;212&gt; PRT

&lt;213&gt; Arabidopsis thaliana

&lt;400&gt; 93

Leu Ser Arg Leu Ala	Pro Phe Glu Arg Gly Ile Tyr Glu Asp Tyr Val
1	5 10 15
Ala Asn Phe Trp Cys	Thr Thr Ser Ile Leu Ile Lys Trp Lys Asn Leu
20	25 30
Phe Thr Thr Gln Ser	Leu Lys Ser Ile Ser Leu Ala Ala Thr Ile Leu
35	40 45

Ala Ser Leu Pro Ser Met Val Gln Gln Ile Leu Ser Pro Ser Asn Glu  
 50 55 60  
 Gly Phe Leu Tyr Gly Leu Leu Asn Ser Ser Met Ala Phe Tyr Leu Phe  
 65 70 75 80  
 Ser Phe Gln Val His Glu Lys Ser Ile Leu Met Pro Phe Leu Ser Ala  
 85 90 95  
 Thr Leu Leu Ala Leu Lys Leu Pro Asp His Phe Ser His Leu Thr Tyr  
 100 105 110  
 Tyr Ala Leu Phe Ser Met Phe Pro Leu Leu Cys Arg Asp Lys Leu Leu  
 115 120 125  
 Ile Pro Tyr Leu Thr Leu Ser Phe Leu Phe Thr Val Ile Tyr His Ser  
 130 135 140  
 Pro Gly Asn His His Ala Ile Gln Lys Thr Asp Val Ser Phe Phe Ser  
 145 150 155 160  
 Phe Lys Asn Phe Pro Gly Tyr Val Phe Leu Leu Arg Thr His Phe Phe  
 165 170 175  
 Ile Ser Val Val Leu His Val Leu Tyr Leu Thr Ile Lys Pro Pro Gln  
 180 185 190  
 Lys Tyr Pro Phe Leu Phe Glu Ala Leu Ile Met Ile Leu Cys Phe Ser  
 195 200 205  
 Tyr Phe Ile Met Phe Ala Phe Tyr Thr Asn Tyr  
 210 215

&lt;210&gt; 94

&lt;211&gt; 252

&lt;212&gt; PRT

&lt;213&gt; Kluyveromyces lactis

&lt;220&gt;

&lt;221&gt; MOD\_RES

&lt;222&gt; (114)...(125)

&lt;223&gt; Xaa is a variable amino acid

&lt;400&gt; 94

Val Ser Thr Ala Leu Ala Phe Ile Gly Ser Phe Gly Pro Ile Tyr Ile  
 1 5 10 15

Phe Gly Gly Tyr Lys Asn Leu Val Gln Ser Met His Arg Ile Phe Pro  
 20 25 30  
 Phe Ala Arg Gly Ile Phe Glu Asp Lys Val Ala Asn Phe Trp Cys Val  
 35 40 45  
 Ser Asn Ile Phe Ile Lys Tyr Arg Asn Leu Phe Thr Gln Lys Asp Leu  
 50 55 60  
 Gln Leu Tyr Ser Leu Leu Ala Thr Val Ile Gly Leu Leu Pro Ser Phe  
 65 70 75 80  
 Ile Ile Thr Phe Leu Tyr Pro Lys Arg His Leu Leu Pro Tyr Ala Leu  
 85 90 95  
 Ala Ala Cys Ser Met Ser Phe Phe Leu Phe Ser Phe Gln Val His Glu  
 100 105 110  
 Lys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr Thr Ser  
 115 120 125  
 Arg Asp Trp Asn Val Leu Ser Leu Val Cys Trp Ile Asn Asn Val Ala  
 130 135 140  
 Leu Phe Thr Leu Trp Pro Leu Leu Lys Lys Asp Asn Leu Val Leu Gln  
 145 150 155 160  
 Tyr Gly Val Met Phe Met Val Thr Pro Arg Phe Leu Pro Lys Phe Leu  
 165 170 175  
 Thr Pro Gly Pro Ser Ile Ser Asp Ile Asp Val Asp Tyr Arg Arg Ala  
 180 185 190  
 Ser Leu Leu Pro Lys Ser Leu Ile Trp Arg Leu Ile Ile Val Gly Ser  
 195 200 205  
 Tyr Ile Ala Met Gly Ile Ile His Phe Leu Asp Tyr Tyr Val Ser Pro  
 210 215 220  
 Pro Ser Lys Tyr Pro Asp Leu Trp Val Leu Ala Asn Cys Ser Leu Gly  
 225 230 235 240  
 Phe Ser Cys Phe Val Thr Phe Trp Ile Trp Asn Asn  
 245 250

&lt;210&gt; 95

&lt;211&gt; 259

&lt;212&gt; PRT

&lt;213&gt; Homo sapiens



&lt;400&gt; 95

Val Lys Leu Ala Cys Ile Val Val Ala Ser Phe Val Leu Cys Trp Leu  
 1 5 10 15  
 Pro Phe Phe Thr Glu Arg Glu Gln Thr Leu Gln Val Leu Arg Arg Leu  
 20 25 30  
 Phe Pro Val Asp Arg Gly Leu Phe Glu Asp Lys Val Ala Asn Ile Trp  
 35 40 45  
 Cys Ser Phe Asn Val Phe Leu Lys Ile Lys Asp Ile Leu Pro Arg His  
 50 55 60  
 Ile Gln Leu Ile Met Ser Phe Cys Phe Thr Phe Leu Ser Leu Leu Pro  
 65 70 75 80  
 Ala Cys Ile Lys Leu Ile Leu Gln Pro Ser Ser Lys Gly Phe Lys Phe  
 85 90 95  
 Thr Leu Val Ser Cys Ala Leu Ser Phe Phe Leu Phe Ser Phe Gln Val  
 100 105 110  
 His Glu Lys Ser Ile Leu Leu Val Ser Leu Pro Val Cys Leu Val Leu  
 115 120 125  
 Ser Glu Ile Pro Phe Met Ser Thr Trp Phe Leu Leu Val Ser Thr Phe  
 130 135 140  
 Ser Met Leu Pro Leu Leu Leu Lys Asp Glu Leu Leu Met Pro Ser Val  
 145 150 155 160  
 Val Thr Thr Met Ala Phe Phe Ile Ala Cys Val Thr Ser Phe Ser Ile  
 165 170 175  
 Phe Glu Lys Thr Ser Glu Glu Glu Leu Gln Leu Lys Ser Phe Ser Ile  
 180 185 190  
 Ser Val Arg Lys Tyr Leu Pro Cys Phe Thr Phe Leu Ser Arg Ile Ile  
 195 200 205  
 Gln Tyr Leu Phe Leu Ile Ser Val Ile Thr Met Val Leu Leu Thr Leu  
 210 215 220  
 Met Thr Val Thr Leu Asp Pro Pro Gln Lys Leu Pro Asp Leu Phe Ser  
 225 230 235 240  
 Val Leu Val Cys Phe Val Ser Cys Leu Asn Phe Leu Phe Phe Leu Val  
 245 250 255  
 Tyr Phe Asn

&lt;210&gt; 96

&lt;211&gt; 1617

&lt;212&gt; DNA

&lt;213&gt; Mus musculus

&lt;400&gt; 96

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atgaagatga gacgctacaa gctctttctc atgttctgta tggctggcct gtgcctcata 60
tccttcctgc acttctttaa gaccttatcc tatgtcacct tcccgagaga actggcctcc 120
ctcagcccta acctcgtatc cagcttcttc tggaacaatg cccctgtcac tcccagggcc 180
agtccggagc cgggtggccc cgacctattg cggacacccc tctactccca ctctcccctg 240
ctccagccac tgtcccccag caaggccaca gaggaactgc accgggtgga ctctcgtgtg 300
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&lt;210&gt; 97

&lt;211&gt; 536

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 97

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Leu Ile Ser Phe Leu His Phe Phe Lys Thr Leu Ser Tyr Val Thr Phe
      20              25              30
Pro Arg Glu Leu Ala Ser Leu Ser Pro Asn Leu Ile Ser Ser Phe Phe
      35              40              45
Trp Asn Asn Ala Pro Val Thr Pro Gln Ala Ser Pro Glu Pro Gly Asp
      50              55              60
Pro Asp Leu Leu Arg Thr Pro Leu Tyr Ser His Ser Pro Leu Leu Gln
65              70              75              80
Pro Leu Ser Pro Ser Lys Ala Thr Glu Glu Leu His Arg Val Asp Phe
      85              90              95
Val Leu Pro Glu Asp Thr Thr Glu Tyr Phe Val Arg Thr Lys Ala Gly
      100              105              110
Gly Val Cys Phe Lys Pro Gly Thr Arg Met Leu Glu Lys Pro Ser Pro
      115              120              125
Gly Arg Thr Glu Glu Lys Thr Glu Val Ser Glu Gly Ser Ser Ala Arg
      130              135              140
Gly Pro Ala Arg Arg Pro Met Arg His Val Leu Ser Ser Arg Glu Arg
145              150              155              160
Leu Gly Ser Arg Gly Thr Arg Arg Lys Trp Val Glu Cys Val Cys Leu
      165              170              175
Pro Gly Trp His Gly Pro Ser Cys Gly Val Pro Thr Val Val Gln Tyr
      180              185              190
Ser Asn Leu Pro Thr Lys Glu Arg Leu Val Pro Arg Glu Val Pro Arg
      195              200              205
Arg Val Ile Asn Ala Ile Asn Ile Asn His Glu Phe Asp Leu Leu Asp
      210              215              220
Val Arg Phe His Glu Leu Gly Asp Val Val Asp Ala Phe Val Val Cys
225              230              235              240
Asp Ser Asn Phe Thr Ala Tyr Gly Glu Pro Arg Pro Leu Lys Phe Arg
      245              250              255
Glu Met Leu Thr Asn Gly Thr Phe Glu Tyr Ile Arg His Lys Val Leu
      260              265              270

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Tyr Val Phe Leu Asp His Phe Pro Pro Gly Gly Arg Gln Asp Gly Trp  
           275                                  280                                  285  
 Ile Ala Asp Asp Tyr Leu Arg Thr Phe Leu Thr Gln Asp Gly Val Ser  
           290                                  295                                  300  
 Arg Leu Arg Asn Leu Arg Pro Asp Asp Val Phe Ile Ile Asp Asp Ala  
 305                                  310                                  315                                  320  
 Asp Glu Ile Pro Ala Arg Asp Gly Val Leu Phe Leu Lys Leu Tyr Asp  
                                   325                                  330                                  335  
 Gly Trp Thr Glu Pro Phe Ala Phe His Met Arg Lys Ser Leu Tyr Gly  
                                   340                                  345                                  350  
 Phe Phe Trp Lys Gln Pro Gly Thr Leu Glu Val Val Ser Gly Cys Thr  
                                   355                                  360                                  365  
 Met Asp Met Leu Gln Ala Val Tyr Gly Leu Asp Gly Ile Arg Leu Arg  
                                   370                                  375                                  380  
 Arg Arg Gln Tyr Tyr Thr Met Pro Asn Phe Arg Gln Tyr Glu Asn Arg  
 385                                  390                                  395                                  400  
 Thr Gly His Ile Leu Val Gln Trp Ser Leu Gly Ser Pro Leu His Phe  
                                   405                                  410                                  415  
 Ala Gly Trp His Cys Ser Trp Cys Phe Thr Pro Glu Gly Ile Tyr Phe  
                                   420                                  425                                  430  
 Lys Leu Val Ser Ala Gln Asn Gly Asp Phe Pro Arg Trp Gly Asp Tyr  
                                   435                                  440                                  445  
 Glu Asp Lys Arg Asp Leu Asn Tyr Ile Arg Ser Leu Ile Arg Thr Gly  
                                   450                                  455                                  460  
 Gly Trp Phe Asp Gly Thr Gln Gln Glu Tyr Pro Pro Ala Asp Pro Ser  
 465                                  470                                  475                                  480  
 Glu His Met Tyr Ala Pro Lys Tyr Leu Leu Lys Asn Tyr Asp Gln Phe  
                                   485                                  490                                  495  
 Arg Tyr Leu Leu Glu Asn Pro Tyr Arg Glu Pro Lys Ser Thr Val Glu  
                                   500                                  505                                  510  
 Gly Gly Arg Gln Asn Gln Gly Ser Asp Gly Arg Ser Ser Ala Val Arg  
                                   515                                  520                                  525  
 Gly Lys Leu Asp Thr Ala Glu Gly  
                                   530                                  535

&lt;211&gt; 2115

&lt;212&gt; DNA

&lt;213&gt; Homo sapiens

&lt;400&gt; 98

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<210> 99

<211> 535

<212> PRT

<213> Homo sapiens

<400> 99

Met Arg Leu Arg Asn Gly Thr Val Ala Thr Ala Leu Ala Phe Ile Thr  
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 Ser Phe Leu Thr Leu Ser Trp Tyr Thr Thr Trp Gln Asn Gly Lys Glu  
 20 25 30  
 Lys Leu Ile Ala Tyr Gln Arg Glu Phe Leu Ala Leu Lys Glu Arg Leu  
 35 40 45  
 Arg Ile Ala Glu His Arg Ile Ser Gln Arg Ser Ser Glu Leu Asn Thr  
 50 55 60  
 Ile Val Gln Gln Phe Lys Arg Val Gly Ala Glu Thr Asn Gly Ser Lys  
 65 70 75 80  
 Asp Ala Leu Asn Lys Phe Ser Asp Asn Thr Leu Lys Leu Leu Lys Glu  
 85 90 95  
 Leu Thr Ser Lys Lys Ser Leu Gln Val Pro Ser Ile Tyr Tyr His Leu  
 100 105 110  
 Pro His Leu Leu Lys Asn Glu Gly Ser Leu Gln Pro Ala Val Gln Ile  
 115 120 125  
 Gly Asn Gly Arg Thr Gly Val Ser Ile Val Met Gly Ile Pro Thr Val  
 130 135 140  
 Lys Arg Glu Val Lys Ser Tyr Leu Ile Glu Thr Leu His Ser Leu Ile  
 145 150 155 160  
 Asp Asn Leu Tyr Pro Glu Glu Lys Leu Asp Cys Val Ile Val Val Phe  
 165 170 175  
 Ile Gly Glu Thr Asp Ile Asp Tyr Val His Gly Val Val Ala Asn Leu  
 180 185 190  
 Glu Lys Glu Phe Ser Lys Glu Ile Ser Ser Gly Leu Val Glu Val Ile  
 195 200 205

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Ser Pro Pro Glu Ser Tyr Tyr Pro Asp Leu Thr Asn Leu Lys Glu Thr
    210                      215                      220
Phe Gly Asp Ser Lys Glu Arg Val Arg Trp Arg Thr Lys Gln Asn Leu
225                      230                      235                      240
Asp Tyr Cys Phe Leu Met Met Tyr Ala Gln Glu Lys Gly Ile Tyr Tyr
                      245                      250                      255
Ile Gln Leu Glu Asp Asp Ile Ile Val Lys Gln Asn Tyr Phe Asn Thr
                      260                      265                      270
Ile Lys Asn Phe Ala Leu Gln Leu Ser Ser Glu Glu Trp Met Ile Leu
                      275                      280                      285
Glu Phe Ser Gln Leu Gly Phe Ile Gly Lys Met Phe Gln Ala Pro Asp
                      290                      295                      300
Leu Thr Leu Ile Val Glu Phe Ile Phe Met Phe Tyr Lys Glu Lys Pro
305                      310                      315                      320
Ile Asp Trp Leu Leu Asp His Ile Leu Trp Val Lys Val Cys Asn Pro
                      325                      330                      335
Glu Lys Asp Ala Lys His Cys Asp Arg Gln Lys Ala Asn Leu Arg Ile
                      340                      345                      350
Arg Phe Arg Pro Ser Leu Phe Gln His Val Gly Leu His Ser Ser Leu
                      355                      360                      365
Ser Gly Lys Ile Gln Lys Leu Thr Asp Lys Asp Tyr Met Lys Pro Leu
                      370                      375                      380
Leu Leu Lys Ile His Val Asn Pro Pro Ala Glu Val Ser Thr Ser Leu
385                      390                      395                      400
Lys Val Tyr Gln Gly His Thr Leu Glu Lys Thr Tyr Met Gly Glu Asp
                      405                      410                      415
Phe Phe Trp Ala Ile Thr Pro Ile Ala Gly Asp Tyr Ile Leu Phe Lys
                      420                      425                      430
Phe Asp Lys Pro Val Asn Val Glu Ser Tyr Leu Phe His Ser Gly Asn
                      435                      440                      445
Gln Glu His Pro Gly Asp Ile Leu Leu Asn Thr Thr Val Glu Val Leu
                      450                      455                      460
Pro Phe Lys Ser Glu Gly Leu Glu Ile Ser Lys Glu Thr Lys Asp Lys
465                      470                      475                      480
Arg Leu Glu Asp Gly Tyr Phe Arg Ile Gly Lys Phe Glu Asn Gly Val
                      485                      490                      495
Ala Glu Gly Met Val Asp Pro Ser Leu Asn Pro Ile Ser Ala Phe Arg

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500	505	510
Leu Ser Val Ile Gln Asn Ser Ala Val Trp Ala Ile Leu Asn Glu Ile		
515	520	525
His Ile Lys Lys Ala Thr Asn		
530	535	

&lt;210&gt; 100

&lt;211&gt; 3226

&lt;212&gt; DNA

&lt;213&gt; Mus musculus

&lt;400&gt; 100

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gtttctggaa gaataagaaa atctacctgg atatcattca caggtacatg gaagtgcacg 1440

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&lt;210&gt; 101

&lt;211&gt; 740

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 101

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Phe	Leu	Val	Thr	Phe	Gly	Phe	Ile	Trp	Gly	Met	Met	Leu	Leu	His	Phe
			20					25					30		
Thr	Ile	Gln	Gln	Arg	Thr	Gln	Pro	Glu	Ser	Ser	Ser	Met	Leu	Arg	Glu
		35					40					45			
Gln	Ile	Leu	Asp	Leu	Ser	Lys	Arg	Tyr	Ile	Lys	Ala	Leu	Ala	Glu	Glu
	50					55					60				
Asn	Arg	Asp	Val	Val	Asp	Gly	Pro	Tyr	Ala	Gly	Val	Met	Thr	Ala	Tyr
65					70					75					80
Asp	Leu	Lys	Lys	Thr	Leu	Ala	Val	Leu	Leu	Asp	Asn	Ile	Leu	Gln	Arg
				85					90				95		
Ile	Gly	Lys	Leu	Glu	Ser	Lys	Val	Asp	Asn	Leu	Val	Asn	Gly	Thr	Gly
			100					105					110		
Ala	Asn	Ser	Thr	Asn	Ser	Thr	Thr	Ala	Val	Pro	Ser	Leu	Val	Ser	Leu
			115					120					125		
Glu	Lys	Ile	Asn	Val	Ala	Asp	Ile	Ile	Asn	Gly	Val	Gln	Glu	Lys	Cys
		130				135					140				
Val	Leu	Pro	Pro	Met	Asp	Gly	Tyr	Pro	His	Cys	Glu	Gly	Lys	Ile	Lys
145					150					155					160
Trp	Met	Lys	Asp	Met	Trp	Arg	Ser	Asp	Pro	Cys	Tyr	Ala	Asp	Tyr	Gly
				165					170					175	
Val	Asp	Gly	Thr	Ser	Cys	Ser	Phe	Phe	Ile	Tyr	Leu	Ser	Glu	Val	Glu
			180					185					190		
Asn	Trp	Cys	Pro	Arg	Leu	Pro	Trp	Arg	Ala	Lys	Asn	Pro	Tyr	Glu	Glu
			195				200					205			
Ala	Asp	His	Asn	Ser	Leu	Ala	Glu	Ile	Arg	Thr	Asp	Phe	Asn	Ile	Leu
		210				215					220				
Tyr	Gly	Met	Met	Lys	Lys	His	Glu	Glu	Phe	Arg	Trp	Met	Arg	Leu	Arg
225					230					235				240	
Ile	Arg	Arg	Met	Ala	Asp	Ala	Trp	Ile	Gln	Ala	Ile	Lys	Ser	Leu	Ala
				245					250					255	
Glu	Lys	Gln	Asn	Leu	Glu	Lys	Arg	Lys	Arg	Lys	Lys	Ile	Leu	Val	His
			260					265				270			
Leu	Gly	Leu	Leu	Thr	Lys	Glu	Ser	Gly	Phe	Lys	Ile	Ala	Glu	Thr	Ala
		275						280				285			
Phe	Ser	Gly	Gly	Pro	Leu	Gly	Glu	Leu	Val	Gln	Trp	Ser	Asp	Leu	Ile

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Thr Ser Leu Tyr Leu Leu Gly His Asp Ile Arg Ile Ser Ala Ser Leu		
305	310	315
Ala Glu Leu Lys Glu Ile Met Lys Lys Val Val Gly Asn Arg Ser Gly		320
325	330	335
Cys Pro Thr Val Gly Asp Arg Ile Val Glu Leu Ile Tyr Ile Asp Ile		
340	345	350
Val Gly Leu Ala Gln Phe Lys Lys Thr Leu Gly Pro Ser Trp Val His		
355	360	365
Tyr Gln Cys Met Leu Arg Val Leu Asp Ser Phe Gly Thr Glu Pro Glu		
370	375	380
Phe Asn His Ala Ser Tyr Ala Gln Ser Lys Gly His Lys Thr Pro Trp		
385	390	395
Gly Lys Trp Asn Leu Asn Pro Gln Gln Phe Tyr Thr Met Phe Pro His		
405	410	415
Thr Pro Asp Asn Ser Phe Leu Gly Phe Val Val Glu Gln His Leu Asn		
420	425	430
Ser Ser Asp Ile His His Ile Asn Glu Ile Lys Arg Gln Asn Gln Ser		
435	440	445
Leu Val Tyr Gly Lys Val Asp Ser Phe Trp Lys Asn Lys Lys Ile Tyr		
450	455	460
Leu Asp Ile Ile His Thr Tyr Met Glu Val His Ala Thr Val Tyr Gly		
465	470	475
Ser Ser Thr Lys Asn Ile Pro Ser Tyr Val Lys Asn His Gly Ile Leu		
485	490	495
Ser Gly Arg Asp Leu Gln Phe Leu Leu Arg Glu Thr Lys Leu Phe Val		
500	505	510
Gly Leu Gly Phe Pro Tyr Glu Gly Pro Ala Pro Leu Glu Ala Ile Ala		
515	520	525
Asn Gly Cys Ala Phe Leu Asn Pro Lys Phe Asn Pro Pro Lys Ser Ser		
530	535	540
Lys Asn Thr Asp Phe Phe Ile Gly Lys Pro Thr Leu Arg Glu Leu Thr		
545	550	555
Ser Gln His Pro Tyr Ala Glu Val Phe Ile Gly Arg Pro His Val Trp		
565	570	575
Thr Val Asp Leu Asn Asn Arg Glu Glu Val Glu Asp Ala Val Lys Ala		
580	585	590

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Ile Leu Asn Gln Lys Ile Glu Pro Tyr Met Pro Tyr Glu Phe Thr Cys
      595                600                605
Glu Gly Met Leu Gln Arg Ile Asn Ala Phe Ile Glu Lys Gln Asp Phe
      610                615                620
Cys His Gly Gln Val Met Trp Pro Pro Leu Ser Ala Leu Gln Val Lys
625                630                635                640
Leu Ala Glu Pro Gly Gln Ser Cys Lys Gln Val Cys Gln Glu Ser Gln
      645                650                655
Leu Ile Cys Glu Pro Ser Phe Phe Gln His Leu Asn Lys Glu Lys Asp
      660                665                670
Leu Leu Lys Tyr Lys Val Thr Cys Gln Ser Ser Glu Leu Tyr Lys Asp
      675                680                685
Ile Leu Val Pro Ser Phe Tyr Pro Lys Ser Lys His Cys Val Phe Gln
      690                695                700
Gly Asp Leu Leu Leu Phe Ser Cys Ala Gly Ala His Pro Thr His Gln
705                710                715                720
Arg Ile Cys Pro Cys Arg Asp Phe Ile Lys Gly Gln Val Ala Leu Cys
      725                730                735
Lys Asp Cys Leu
      740

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<210> 102

<211> 4

<212> PRT

<213> Artificial Sequence

<220>

<223> Illustrative retention signal peptide

<400> 102

Lys Asp Glu Leu

1

<210> 103

<211> 60

&lt;212&gt; PRT

<213> *Saccharomyces cerevisiae*

&lt;400&gt; 103

```

Ile Pro Phe Val Leu Ile Ala Ser Asn Phe Ile Gly Val Leu Phe Ser
 1             5             10             15
Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro
          20             25             30
Ile Leu Ile Phe Trp Ser Gly Met Pro Phe Phe Val Gly Pro Ile Trp
          35             40             45
Tyr Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro
          50             55             60

```

&lt;210&gt; 104

&lt;211&gt; 58

&lt;212&gt; PRT

<213> *Drosophila virilis*

&lt;400&gt; 104

```

Leu Pro Phe Phe Leu Cys Asn Phe Ile Gly Val Ala Cys Ala Arg Ser
 1             5             10             15
Leu His Tyr Gln Phe Tyr Ile Trp Tyr Phe His Ser Leu Pro Tyr Leu
          20             25             30
Val Trp Ser Thr Pro Tyr Ser Leu Gly Val Arg Tyr Leu Ile Leu Gly
          35             40             45
Ile Ile Glu Tyr Cys Trp Asn Thr Tyr Pro
          50             55

```

&lt;210&gt; 105

&lt;211&gt; 60

&lt;212&gt; PRT

<213> *Saccharomyces cerevisiae*

&lt;400&gt; 105

```

Ile Pro Phe Val Leu Ile Ala Ser Asn Phe Ile Gly Val Leu Phe Ser

```

1	5	10	15
Arg Ser Leu His Tyr Gln Phe Leu Ser Trp Tyr His Trp Thr Leu Pro			
20	25	30	
Ile Leu Ile Phe Trp Ser Gly Met Pro Phe Phe Val Gly Pro Ile Trp			
35	40	45	
Tyr Val Leu His Glu Trp Cys Trp Asn Ser Tyr Pro			
50	55	60	

<210> 106

<211> 59

<212> PRT

<213> Drosophila melanogaster

<400> 106

Leu Pro Phe Phe Leu Cys Asn Leu Val Gly Val Ala Cys Ala Ser Arg			
1	5	10	15
Ser Leu His Tyr Gln Phe Tyr Val Trp Tyr Phe His Ser Leu Pro Tyr			
20	25	30	
Leu Ala Trp Ser Thr Pro Tyr Ser Leu Gly Val Arg Cys Leu Ile Leu			
35	40	45	
Gly Leu Ile Glu Tyr Cys Trp Asn Thr Tyr Pro			
50	55		